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[ORIGINAL COMMUNICATION.]

COMMENTARY UPON SOME FORMULAS OF THE NATIONAL FORMULARY.

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No. 4.—LAC FERMENTATUM.

A. *Kumyss* (Nat. Form.).

KUMYSS is generally designated as fermented milk. As this term implies the meaning of alcoholic fermentation, the definition is incorrect, since lactic fermentation has as much share in shaping the final result, by acting on both the proteid substances and the sugar, as vinous fermentation does. It is not even the sugar contained in milk which is attacked by the ferment which induces alcoholic fermentation, for the product of its fermentation is furnished by sugar foreign to milk, purposely added to it. Kumyss may, therefore, more properly be defined as being obtained by alcoholic fermentation of sugar, not *of* milk, but *in* milk.

The various phases of the process which take place in the formation of kumyss, and the changes which the constituents of milk must undergo, may be thus briefly stated:

Some sugar is added to milk, then brewers' or cake yeast (grocers' yeast), and the mixture is left to itself. In the course of time, varying in length according to temperature, the effects of alcoholic and of lactic fermentation make themselves apparent: the first, by evolution of gas, through the splitting up of some of the sugar into alcohol and carbonic acid, of which the latter is the most conspicuous; the lactic fermentation, by the appearance of lactic acid, generated through a re-arrangement of the atoms in the sugar-molecule, and in the influence of lactic ferment, which transformation manifests itself by throwing the casein out of solution.

While albumen may be considerably acidulated without losing its solubility, casein, as an alkali-proteid, is soluble only in slightly alkaline solutions, and is extremely sensible, in this respect, towards acids. If lactic fermentation is so far progressed that neutrality is passed, the casein is thrown out as a coherent jelly, which, when undisturbed, becomes more compact by contraction and expulsion of serum, and finally conglomerates into separate fibrous lumps, which cannot be divided any more. But if this gelatinous precipitate is agitated ever so slightly in the incipient stages of its formation, it is readily broken up into an impalpable cream, which may be kept finely suspended in the liquid for a length of time, if the necessary conditions of temperature are observed.

If the generation of carbonic acid gas has been lively enough before the lactic fermentation produces its effects, or if it is aided by occasional shaking of the bottles, all the butter fat is enveloped in the precipitate of the casein without affecting its divisibility. Hence the function of the carbonic acid is this, that, by the expansion and mobility due to its gaseous nature, it reduces the casein to the finest possible condition—much finer than other mechanical means can do. When the precipitation and division of the casein are effected, and enough carbonic acid gas is found to cause lively effervescence, the kumyss is ready for use. The time in which this is accomplished depends on conditions of temperature at which the fermentation takes place, and on the proportions of the additions. Upon the observance of the most favorable conditions depends also the quality of the product, and it is here where the formula and the directions given in the National Formulary need a correction, in order to obtain an irreproachable preparation of kumyss.

a. *Addition of Sugar.*—Milk-sugar is not readily attacked by yeast. Contrary to statements in books that vinous fermentation will set in after the milk turns sour, and that thereby the milk-sugar becomes changed to glucose, I find that milk more easily enters fermentation under addition of an alkali, by which the souring is prevented. The same is the case with cane-sugar; and as it is desirable to have the alcoholic fermentation started before the lactic fermentation acts on the casein, the addition of fermentable sugar, in the shape of grape-sugar or honey, is indicated. Its quantity must be regulated according to requirements only. Nothing is more annoying to the unwary consumer than the opening of an overcharged bottle of kumyss, which generally results in the spattering of its contents promiscuously about the room. The quantity prescribed in the N. F. for two pints of milk is amply sufficient for two gallons, and may only be increased for kumyss dispensed in patent bottles, or if drawn from ordinary bottles by means of a tap.

b. *Temperature.*—The temperature prescribed in the formula may turn out to be disastrous in the manufacture of kumyss.

Milk is a peculiarly complex preparation. It is not an emulsion, as sometimes stated in books, but contains the fat inclosed in separate cells, which rises to the surface as layer of cream if milk is left in undisturbed repose or subjected to centrifugal force. Boiling does not burst these cells or separate the fat; but if milk is left for hours at a temperature above the melting point of butter fat, 65° F., or if subjected to violent commotion, such as churning at the same temperature for a short time, practically all the fat is separated. Again, if casein is precipitated from fresh milk by means of acids, at any temperature, it incloses all the fat in its meshes, and also the jelliform casein separated from milk by rennet includes the butter firmly. But if milk is allowed to turn sour, the fat separates from the casein readily by keeping it a short time at temperatures above the melting point of the butter-fat. At the same time the finely divided casein conglomerates into more compact lumps, and the kumyss is spoiled.

Although milk, as long as it is sweet, may be kept at 90° F. with impunity, this same temperature is deleterious to the product after souring sets in. The casein turns lumpy, and the fat may be seen floating in the neck of the bottle as a yellow mass. This temperature is unnecessary for the manufacture of kumyss. Vinous fermentation takes place at much lower temperatures, and the higher degrees only favor the lactic fermentation by which the kumyss gets too acid to be drunk by the bottleful.

The sugar is not all consumed by either kind of fermentation. If milk is allowed to turn sour, only one-tenth to one-eighth part of its sugar is changed to lactic acid, and also the vinous fermentation stops before all the sugar is used up. But the lactic fermentation goes on slowly, acting on the sugar which is left, and the kumyss turns gradually more and more acid the longer it is kept. Pretty old samples of kumyss still react on Fehling's solutions.

In place of preparing kumyss with sweet milk, and waiting until it turns sour, the casein may be precipitated at once, by the addition of one-third of ready kumyss to fresh milk. Yeast is not necessary, but sugar must be added to produce enough carbonic acid gas to cause effervescence.

Kumyss may also be made from sour milk, freed of its crust of cream, by breaking up the gelatinous mass by vigorous concussion, and causing alcoholic fermentation by addition of sugar and yeast. This preparation would be nearly devoid of cream, but a proportion may be brought in by addition of sweet milk.

The time in which kumyss becomes ready for use depends as much on the quantity and activity of the ferment as on the temperature. With plenty of yeast and a prevailing temperature nearer to 90° than 60° F., the course of fermentation may be said to be even stormy, and the process is completed in as many hours as days may be consumed when the temperature is kept lower. But it is safer to operate at a lower temperature, by which a much finer product is obtained. Besides, by a slow after-fermentation, the kumyss becomes ripened, and in the course of one to two weeks a cheesy or butyracous flavor is acquired which is generally regarded as a necessary characteristic of good kumyss.

Commercial preparations of kumyss never correspond to fully undiluted milk. Kumyss made from undiluted milk is too rich and requires too great care to be practicably handled by the large manufacturer. But the pharmacist who disposes of his own production directly to the customer may easily take the necessary precautions against disastrous influences, and may give his customers the benefit of an undiluted preparation which kumyss is supposed to be.

Samples of commercial preparations of kumyss I found either to be more or less deficient in cream, or to be made from watered milk, or both. Dr. Brush's kumyss, for instance, commanding the largest sale in this city, gave, on analysis, only two-thirds of the casein and fat in the proportions in which they exist in milk, indicating a corresponding watering of the milk.

B. *Kephir.*

This is a fermented milk beverage identical with kumyss in its finished state. It differs from the latter by being produced by aid of a different ferment. The kephir ferment was originally brought from the Caucasus, but may be procured in this market from home culture. It comes in the shape of grains of various forms and sizes, very much resembling bits of the inflorescence of cauliflower, constituting a compound fungous growth resulting from the cohabitation of a fleshy fungus with a certain species of *Saccharomyces*, which latter alone plays the active rôle of enacting vinous fermentation of the saccharine constituent of milk. This peculiar Saccharomyces differs from

the brewer's yeast by starting vinous fermentation in milk without addition of a fermentable sugar, and fermentation progresses to a certain advanced degree while the milk is yet sweet, or before lactic fermentation produces its effect. It is, therefore, possible to obtain an effervescing kumyss by its aid with a much less degree of acidity than that obtained by the *Saccharomyces cerevisiæ*, and it may be concluded that kephir yeast is better adapted for the fermentation of milk than beer yeast is. By after-fermentation the same degree of acidity is reached as in kumyss obtained through the action of ordinary yeast. This peculiarity has led to a distinction in the use of the different stages of fermentation of kephir, as it has been observed that young kephir which is yet sweet acts as a slight purgative, while an older, or more acid, or "stronger" kephir exerts a constipating effect on the bowels, and is less easily borne by delicate stomachs.

Kephyr kumyss is prepared by adding active kephir grains to milk, preferably kept at a temperature between 70° and 80° F., until the effect of fermentation becomes apparent by the rising of the grains to the surface, being carried upward by bubbles of carbonic acid gas attached to them. The grains may then be strained off, and the milk, which now contains enough yeast cells to insure the continuance of the fermentation, left to itself in well-corked bottles.

As the yeast cells propagate themselves, more fresh milk may be added previous to bottling.

The directions accompanying the kephir grains direct that the grains should be left in the milk until the casein separates from the serum, and that this strained product shall be used as the ferment of about four times its bulk of fresh milk. (Several prominent houses who sell kephir grains accompany them by printed directions which fail to start their activity altogether.)

If kephir is once obtained by this means, the further production may be simplified in the same manner as in the case of kumyss, by adding a quantity of ready kephir to a multiple of fresh milk, and this may be continued through many generations without having further recourse to the original kephir grains.

The printed directions recommend the employment of milk previously boiled. The advantage of this proceeding is supposed to be this, that the lactic fermentation is retarded, to which end a washing of the kephir grains with a two-per-cent solution of carbonate of sodium is prescribed for the removal of the rest of lactic acid tenaciously retained by the grains.

Commercial kephir grains may be found to be quite inert by the buyer uninitiated in the art of developing them properly. The fact is, that their activity must be first started, and directions to do so are given with the samples, but in spite of following them closely, they may fail to give satisfactory results. The secret of success seems to me to be to keep the grains in fresh milk at a temperature of 70° to 80° F., and to change the milk once or twice daily, or as often as the milk threatens to become sour. The time may have to be extended to a week, until their action becomes manifest by the generation of gas.

Kephir grains are also apt to decay, and these inert grains have to be removed. Those which retain their vitality may be recognized by their turgor or toughness to the touch, while the decayed ones crumble between the fingers like soft cheese.

The usefulness of kumyss as a dietetic hinges upon the fine division of its casein. Indeed, if a well-prepared kumyss is subjected to digestive influences, the finely-divided and diffused precipitate of casein dissolves at once, while the floccular casein, otherwise obtained, resists the peptic action remarkably long.

C. *Matzoon.*

Matzoon is a peculiar milk preparation, also stated on the label to be fermented milk, although there is no evidence of its having undergone alcoholic fermentation. It is devoid of gas, and appears as a viscid liquid, showing a rather coarsely granular mass of precipitated case in, well suspended in a serum which corresponds to that obtained from sour milk. Although betraying great richness from its appearance, the analysis gives amounts of casein as corresponding to undiluted milk and two-thirds of its cream.

1 fl. oz. of cow's milk contains grains (average).	Kumyss from milk.	Dr. Brush's kumyss.	Matzoon.
Sugar 22	—.	—	20
Casein..... ..14	14	10	14
Fat ... .15	15	9	7
Lactic acid .....—	1.5	3	.1

Glucose. Lactic Acid.
$C_6H_{12}O_6 = 2HC_3H_5O_3$

Glucose. Alcohol.
$C_6H_{12}O_6 = 2C_2H_6O + 2CO_2$

Glucose yields by fermentation: Alcohol, 48.5%.
Carbonic acid, 46.5%.
Glycerin, 3 6%.
Other products, 1.4%.

5. Liquor Zinci et Ferri Compositus.

Deodorizing Solution.

A study, theoretical as well as practical, of the inside working of deodorizing agents elucidated the following facts. All animal and vegetable matters richly endowed with proteids, if left to themselves, soon begin to decay by entering into putrid fermentation. They begin to exhale unsavory effluvia, which, in time, grow into a horrid compound stench of many individual smells. From this bouquet of bad odors a practised nose easily singles out the penetrating ammoniacal compounds, as well as sulphuretted and phosphoretted vaporous bodies, not yet named or individualized. If to such a putrid malodorous mass any kind of acid is added, one half of its offensiveness is gone. Soluble salts of aluminium, zinc or iron act in the same manner as free acids, neutralizing the ammoniacal bodies, but leaving the other half of the stench. It is only the acid radical in these salts which acts, the base being thrown out of solution as useless. And useless it is, as these bases have no power to bind the sulphur compounds securely enough, and their only advantage over free acids must be sought in their rendering the latter safer to handle, and in this, that by their employment neutrality of the mass is preserved even if a large surplus of the disinfecting solution is used. One pound of sulphuric acid is represented by about 3 pounds of sulphate of iron, and by about 2½ pounds of either sulphate of aluminium or of zinc. For the deodorization of the other more horrid and nauseating stenches, the metal bases just named are powerless. But salts of lead, copper, mercury and those of the whole list of the precious metals readily capture and imprison these refractory bodies, and the entire complex of bad odors disappears on addition of any of these metals in solution. The stenches are "silenced" or "deadened," as a certain pamphlet on disinfection has it, and the mixture turns at once "sweet," as the phrase goes.

Of the whole series of metals suitable for this purpose, copper is the most serviceable. Its sulphate mixes readily with those present in formula No. 241, and is at once cheap and effective. I would recommend the addition of one ounce per pint of the solution.

The formula would then read:

Sulphate of Zinc.....	16 tr. oz.
Sulphate of Iron.....	16 tr. oz.
Sulphate of Copper...	5 tr. oz.
Naphthol	20 grs.
Oil of Thyme...	60 min.
Diluted Hypophosphorous Acid.....	120 min.
Water.....	enough to make 5 pints.

[The title would have to be modified, so as to correspond to the new ingredient. We would suggest either Liquor *Zinci, Ferri et Cupri Compositus*, or simply *Liquor Deodorans*.—Ed. Am. Drugg.]

6. M'Munn's Elixir of Opium.

This title had been proposed to the N. F. Committee for adoption, but on further consideration it was not listed in the book. The desire was to use the title as a synonym of the officinal "Deodorized Tincture of Opium," because it was supposed that by this semi-official recognition the latter preparation might get familiarized to those medical men who still cling to the secret preparation.

The proposition was objected to by one of the collaborators of the book, on the strength of certain general reactions, from which the dissimilarity of the two preparations was deduced. If these experiments or reactions were wanting in anything, it was the morphiometric assay of the preparations to solve the question forever. This want I have tried to supplement, and I may state the differences in the following table:

1 fluidounce contains	Grs. Morphine.	Grs. Extract.	Per Cent Menstruum Alcohol.	Narcotin
M'Munn's Elixir.....3.6		10	80	none.
Deodorized Tinct. of Opium.6.3		24	47	none.

Note.—It must be remembered that the morphine is assayed as pure alkaloidal morphine, and that 6 grs. of this pure morphine corresponds to 7 grs. of the sulphate.

Rapid Analysis of Water for Industrial Purposes.

In most cases it is advisable to purify water previous to using it for industrial purposes when there is a solid residue of 0.3 Gm. or more per liter of the water. L. Vignou's method consists in saturating the acid carbonates contained in the water with lime, and then precipitating all the lime and magnesia salts still in solution with sodium carbonate. Phenolphthalein is used as an indicator, and decinormal clear lime-water is required. The titration is conducted in two narrow glass-stoppered cylinders of about 100 C.c. capacity. Into one 50 C.c. of distilled water and 10 drops of an alcoholic solution of phenolphthalein are introduced; this is then colored by 0.2–0.5 C.c. of the normal lime solution, and kept as standard. The other cylinder is filled with 50 C.c. of the water under examination, 10 drops of phenolphthalein solution, and 5 C.c. of a 10-per-cent neutral calcium chloride solution. The normal lime-water is then added until, on agitating, the solution remains colored. The standard is now diluted until its volume corresponds to the volume of liquid in the other cylinder, and a little lime-water added to one or the other solution until the color in both is identical. The difference in the quantity of lime-water used for the standard and for the water under examination gives the quantity of lime which has combined with the free carbonic acid in the water.

In order to determine the quantity of soda required to precipitate the lime in the water, 100 C.c. of the latter are mixed in a graduated 250 C.c. cylinder with the quantity of lime-water necessary to combine with any free carbonic acid, 5 C.c. of phenolphthalein solution then added, and the mixture, after shaking, allowed to settle. Exactly one-half of this solution is placed in one of the cylinders previously used for the colorimetric determination, and the amount of soda (containing 1 Gm. of Na_2CO_3 per liter) ascertained which is necessary to produce a recoloration. This must be equal in intensity to the standard made by adding to distilled water the same amount of phenolphthalein contained in the former solution and colored by a small quantity of the soda solution. From the above data the quantity of lime and soda which it is necessary to add to the water may be readily deduced.

Water containing notable quantiites of magnesium sulphate or chloride cannot safely be tested by this method. —*Bull. Soc. Chim.* and *J. Soc. Ch. Ind.*

[ORIGINAL COMMUNICATION.]

THE ESTIMATION OF UREA.*

LIEBIG'S method by precipitation with nitrate of mercury is probably of all methods the most reliable and accurate. But it requires great care and takes some time, unless all the reagents are kept on hand ready for use. Moreover, the process, as usually executed, is applied to a *measured*, not weighed quantity of urine, and therefore liable to yield variable results due to varying temperature, inaccuracy of measuring vessels, etc. Hence it is now deemed generally preferable to use, at least for practical or clinical purposes, a less circumstantial method, which can be applied in a short time. This is the *hypobromite* method of Knop. When hypobromite comes in contact with urea, or certain other readily decomposable nitrogen compounds, the latter split up into a carbon dioxide, nitrogen, and water:

$$\underset{\text{urea}}{CH_4N_2O} + \underset{\substack{\text{sodium}\\\text{hypobromite}}}{3NaBrO} = \underset{\substack{\text{sodium}\\\text{bromide}}}{3NaBr} + \underset{\substack{\text{carbonic}\\\text{acid gas}}}{CO_2} + \underset{\text{nitrogen}}{N_2} + \underset{\text{water}}{2H_2O}$$

If provision is made to have this reaction transpire in a confined space, and some liquid be present which will absorb the carbonic acid gas, only the nitrogen will be left behind, which may be measured, and thereby indicate the quantity of urea. This process is, of course, also affected with sources of error, among which the principal ones are, that the gas varies considerably in volume according to the temperature to which it is exposed; besides, a small portion of the nitrogen is lost by being retained in solution. Nevertheless, the results, if ordinary precaution is taken, are remarkably uniform. It should be added that the hypobromite exerts but little action upon the uric acid and other nitrogen compounds contained in the urine, outside of the urea. In this respect it has an additional advantage over Liebig's method. The results obtained are, for the reasons above mentioned, somewhat short of the actual quantity, but as this error is pretty nearly constant, it may be disregarded when making comparative experiments. Moreover, if a check-experiment is made with a solution of pure urea, the error may be easily eliminated.

We shall give a description of the process as we are in the habit of executing it.

The following solutions are kept on hand, ready for use:

A. Solution of Caustic Soda, spec. grav. 1.120.

B. Solution of 90 Gm. of Bromine and 75 Gm. of Bromide of Potassium in 360 Gm. of Water.

This solution is made as follows: The bromide of potassium is dissolved in 300 Gm. of water, and the solution placed into a measuring cylinder which is stoppered and accurately tared. It is then taken to a place where bromine vapors can do no harm, and 30 C.c. of bromine added to it, after which it is stoppered and replaced on the scale. If less than 90 Gm. has been added, this is easily remedied. A little excess does no harm. Finally enough water is added to make the contents weigh 525 Gm.

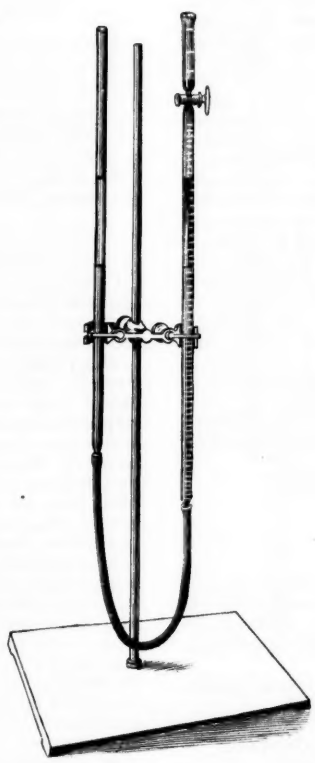
C. A solution of pure Urea, recrystallized from absolute alcohol and dried over sulphuric acid, containing 2 Gm. of the urea and 10 Gm. of chloride of sodium in 100 C.c. Theoretically, 1 Gm. of urea, when decomposed by hypobromite, should yield at 0° C., and at 760 Mm. pressure, 371.37 C.c. of nitrogen. But this is not obtained in practice. French chemists are in the habit of putting the figure at 340 C.c.; others use the figures 354, 360, etc. We find it preferable always to make a blank assay with 4 C.c. of the urea solution, which should, theoretically, yield about 29 C.c. of nitrogen, but which in practice will yield perhaps only 25. Whatever it may yield under the circumstances of temperature, etc., prevailing on the day of assay, is taken as equivalent to the urea present in 4 C.c., that is, 0.08 Gm. of urea.

D. A solution of chloride of sodium, spec. grav. about 1.120.

The process is executed as follows:

First pour into a measuring cylinder 95 C.c. of the soda solution (A), and afterwards 30 C.c. of the bromine solution (B). This reagent, if kept in a cool and dark place, may be preserved for a short time, but it is better to make it freshly when wanted.

Adjust the two tubes of the apparatus about as shown in the cut, open the faucet and pour into the open tube 40 C.c. of the hypobromite solution just prepared, which will rise a short distance up each tube. Now raise this tube until the liquid contained in it is just visible above the attachment of rubber tubing to the burette, and then slip a pinch-cock off the neck upon the rubber tube itself. Next pour into the open tube about 50 C.c. of the chloride of sodium solution, lower the burette as far, and raise the open tube as high as possible, and by carefully opening the pinch-cock before mentioned, cause the chloride of sodium solution to push the hypobromite solution along the burette until it is within a short distance of the stop-cock. Now transfer the control of the flow to the stop-cock until the burette is completely filled with liquid without a sign of a bubble of air. The use of the pinch-cock, therefore, is simply to prevent the chloride of sodium solution, when being poured in on top of the hypobromite, to mix with the latter so as to dilute it.



A quantity of the urea solution (*E*) is now poured into the graduated top of the burette, and the level of the two tubes reversed, the burette being raised high and the open tube low, the pinch-cock at the end of the latter being kept open by being slipped over the end of the glass tube. By carefully opening the stop-cock, exactly 4 C.c. of the urea solution are allowed to flow into the measuring burette. At once there will be a brisk generation of gas; but as the column of liquid in the burette acts as an aspirator, no gas is lost through the stop-cock, which is closed when 4 C.c. are added. After the first effervescence is over, the burette is taken from its clamp, being held high; and a stopper having been put into the top to prevent the contents from being spilled about, the tube is gently inclined to a nearly horizontal position, whereby the urea solution and the reagent are more thoroughly mixed. This is repeated once or twice, and when no more effervescence is observed, the tube is replaced in its clamp and allowed to stand for about fifteen minutes, so that the gas and liquid may acquire the temperature of the room. A longer time is still preferable. But when time presses, the reading off may be done soon after the reaction is finished. In the subsequent actual test upon urine, the same manipulation and time must be observed. Finally, the two tubes are so adjusted that the level of the liquid in both is in one plane. The number of C.c. of gas is now read off. Supposing we find 30 C.c. Then these represent 0.08 Gm. of urea. Hence every C.c., under the conditions prevailing that day, represents 0.00266 Gm. urea.

After this blank experiment, the apparatus is cleaned, and the same process repeated, the urine itself being taken instead of the urea solution. In order that the results be as correct as possible, the amount of gas produced should, as nearly as possible, equal that in the blank experiment. Hence, if in one trial is found that 4 C.c. give materially more or less than 30 C.c. of gas, the experiment should be repeated with a proportionately smaller or larger amount, say 3.5 C.c., 4.5 C.c. or 5 C.c., as the case may be.

Each assay, in practised hands, requires only about ten minutes, not counting the time for allowing the apparatus to cool.

If the urine which is to be tested is cloudy, it must be filtered, by being passed through a *dry* filter. Passing through a *wet* filter would dilute it. If urine is very rich in urea, it is best—rather than to measure out a very small quantity—to dilute it to twice its volume with water.

When reporting the quantity of urea to a physician, it is customary to give it in percentage. We always make allowance, in making the calculation, for the specific gravity of the urine, so that our percentage figure truly represents *weight*. Many others merely take the quantity

* In reply to a query.

of urea as found in the *measured* amount of urine, and reckon out the percentage without correction. The error is a small one, it is true, but is easily avoided by multiplying the result with 1,000 and dividing by the specific gravity carried to 3 decimals.

A determination of urea in a fraction of a day's excretion, without the total volume of the latter being known, is of very little value, and physicians should be reminded of this, when they send samples to be tested. Supposing a sample has been voided by a person shortly after he has drunk a large quantity of liquid, perhaps on a hot day. This will certainly be abnormally low in urea. The whole quantity voided in twenty-four hours should always be carefully collected and sent.

Commercial Notes on Cinchona Bark and its Alkaloids.

THE Annual Report of the well-known firm of Zimmer & Co.* for 1888 contains some valuable and interesting notes and statistics, from which we take the following:

The principal place of production for [cultivated] cinchona barks has been and is still Ceylon, and the fluctuations occurring in its bark trade may, to a certain extent, be taken as measure for the general market.

It is difficult to obtain exact information regarding the actual condition of the Ceylon cinchona plantations. At all events, the alleged uprooting of plantations, on account of failure of revenue, need not be considered an absolutely assured fact. At the same time it is probably true that the cultivation has, to a considerable extent, been contracted, the plantations where cinchona alone is raised having diminished in number from 23,853 in 1885–6, to 12,541 in 1887–88. Some reports place the number of two-year-old cinchona trees at 36,655,000, while others put it as low as 16,000,000. The latter figure is probably nearer the truth. The contraction of cultivation is of course largely due to the fact that inferior species had been raised or improper localities had been selected. The experience, however, which has been acquired by the planters in the course of time will make a repetition of these errors improbable in the future. Moreover, the species which now constitute the main stock of the plantations are nearly all carefully-selected, high-grade ones, so that it takes a much smaller amount of bark to yield the same quantity of quinine than it did some years ago. While the quantity of bark shipped from Ceylon in 1887–8 was nearly 2¾ million pounds less than in the preceding year, it is probable that the exports of both years represented about the same amount of quinine.

The direct shipment of Ceylon bark to the United States has very much diminished, as the following synopsis shows:

1885–86: 554,430 pounds.
1886–87: 392,027 "
1887–88: 100,980 "

The quality of Ceylon bark has become materially improved, since the inferior bark has almost ceased to be exported. What is brought to market now is derived, almost exclusively, from Cinchona succirubra, C. officinalis, and hybrids derived from them.

The amount of trees existing in the East India plantations, outside of Ceylon, is estimated as follows:

Sikkim	4,750,000 trees
Darjeeling	2,100,000 "
Neilgherry	7,000,000 "
Travancore, Wynaad, Mysore, etc.	8,000,000 "

The export has risen from 699,258 lbs. in 1881 to 1,449,315 lbs. in 1888. Of course this does not represent the total harvest, since a very large proportion of the bark is worked up in India itself for "febrifuge" (an impure mixture of the alkaloids).

The great care and attention which has of recent years been bestowed by the Dutch upon their Java barks has resulted in a much higher percentage of alkaloidal yield than has been obtained elsewhere. The inferior species are being replaced, as rapidly as possible, by the valuable Ledgeriana, Officinalis, and their hybrids. The average amount of alkaloid in the barks at present exported is about 4 per cent, and will be considerably higher. In exceptional cases the alkaloidal percentage has risen to an astonishing figure, 10 per cent being not at all uncommon, and 16 per cent being the highest so far observed.

Considerable complaint has been made during last year over the damages caused by vegetable and animal parasites. Among the former was a dangerous fungus, *Hormiscium pannosum* Oud.; but energetic measures have by this time probably removed all danger.

It is estimated that there are about 60 cinchona plantations upon Java, with about 30,000,000 trees of different ages. The export of bark amounted, in 1883–84, to 1,104,534 lbs.; in 1887–88, to 3,742,025 lbs.

The German plantations of cinchona in Bolivia, upon the eastern slope of the Cordilleras, to the north and east of La Paz (at Longa, Yungas, and Mapiri), continually increase their export, which has been rendered more profitable by the abolition of the Bolivian export duty of 3½ bolivares per quintal. In 1885, 2,599 colli were exported; in 1888, 7,810 colli. The bark, a calisaya, is excellent, yielding generally over 4 per cent of alkaloids. Part of it goes to London, the rest to Paris and Hamburg.

The cultivation of cinchona in Columbia has not yet made very decided progress, there being only three larger plantations, one near Bogotá, and the two others in the province of Tolima, near Columbia and Chaparral. They contain very young trees, but of valuable species, such as Ledgeriana, Officinalis, Lancifolia, and Pitayensis (the latter being specially rich in quinidine).

The following statistics are given regarding the import of bark and sulphate of quinine in the United States during the last 13 years:

	Bark (lbs.).	Quinine (oz.).
1875–76	5,280,159	22,746
1876–77	1,760,446	75,804
1877–78	4,826,290	17,549
1878–79	6,389,378	228,348
1879–80	6,013,877	416,998
1880–81	4,219,403	408,803
1881–82	5,010,547	794,495
1882–83	3,639,315	1,055,704
1883–84	2,588,307	1,263,732
1884–85	3,559,691	1,390,126
1885–86	4,447,082	1,251,556
1886–87	4,787,311	2,180,157
1887–88	2,801,443	1,628,414

The consumption of sulphate of quinine has been estimated in the Ceylon Handbook and Directory for 1887–88, to be as follows:

United States	3,200,000 oz.
Other countries (enumerated there, but omitted here,)	4,256,000 "

These figures are regarded by competent judges to be not far from the actual facts.

Purification of Bisulphide of Carbon.

IN a paper read before the Society of Chemical Industry, Ignatius Singer, after describing the methods and apparatus used in manufacturing bisulphide of carbon, made the following remarks regarding its purification:

The product obtained by the process before described contains considerable quantities of sulphur in solution, also a large amount of hydrosulphuric acid and other sulpho-compounds, which impart to it a pale-yellow color and a very disagreeable odor. Of these impurities it can be easily freed by careful rectification, leaving a colorless, mobile liquid of an odor not at all disagreeable, and resembling that of chloroform. Commercial bisulphide of carbon is seldom pure, and in many instances differs from the crude substance only in containing a lesser quantity of free sulphur, while nearly all the other impurities which impart to it that disagreeable smell are still contaminating it. From the latter it cannot be freed by simple distillation, as the hydrosulphuric acid and other gases distil over with it and are re-absorbed during condensation.

From the many methods which have been suggested for its purification, I shall describe the only one which can be employed on the large scale, the others being too expensive for commercial purposes, without offering any special advantages.

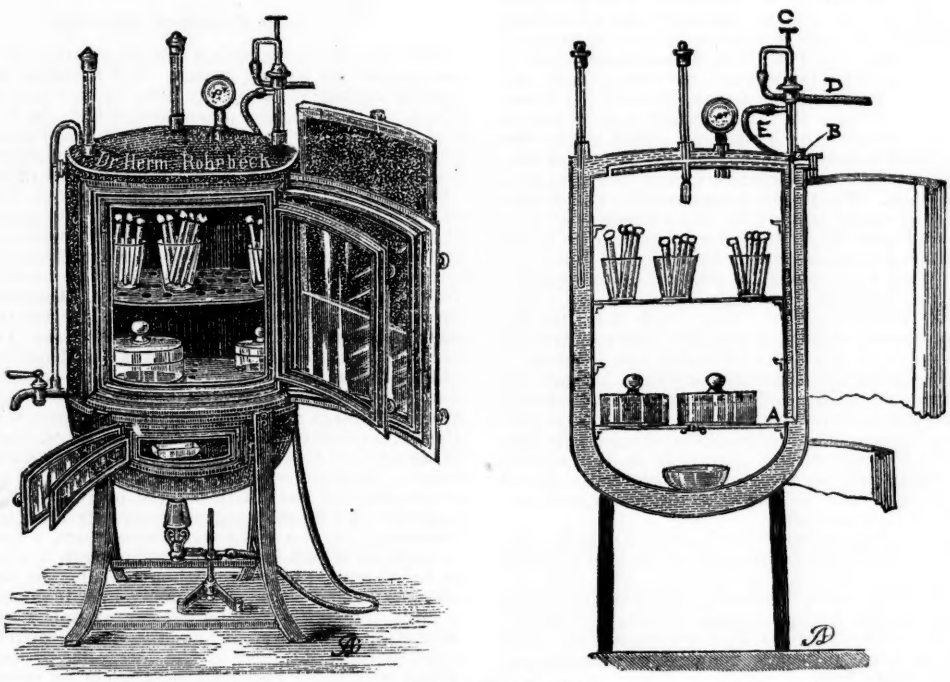
A cylindrical vessel, about thirty inches in diameter and six feet high, is provided with a perforated coil of lead pipe at the bottom. Into this vessel I run the bisulphide to be purified to about one-third in height. I then pump lime-water into it, the latter being introduced into the vessel, by means of a force-pump, through the perforated coil. The lime-water, being specifically lighter than the bisulphide, rises to the surface, and, while traversing the body of the bisulphide in a finely divided spray, the lime combines with the hydrosulphuric acid, etc. I continue this washing until the lime-water, which leaves the vessel through an overflow pipe near the top, is perfectly clear. The bisulphide is now run into a still, about one per cent of its weight of a cheap, colorless oil is added, and covered with a layer of about one inch of water, to which some acetate of lead may be added. The bisulphide is now distilled in a water-bath, and condensed in the usual way. A very pure product is obtained in this manner. I have treated in this way bisulphide bought from a Manchester maker, which was supposed to be "rectified." Its specific gravity was 1.292. After having washed it as just described, it had a specific gravity of 1.289, which was reduced to 1.286 after distillation."—After *J. Soc. Chem. Ind.*, 1889, 96.

To Make Holes in Earthenware, Porcelain, etc.—According to the *Scientific American*, holes may be bored in earthenware, porcelain, etc., by drilling, in a lathe, with a drill of soft copper, and a mixture of emery and linseed oil. The emery is fixed, by the friction, in the face of the copper drill, and the tool thus armed will perforate the hardest material in a very short time.

* "Vereinigte Fabriken chemisch-pharmaceutischer Produkte, Feuerbach-Stuttgart und Frankfurt a. M., Zimmer & Co."

AN IMPROVED THERMOSTAT.

HERMANN ROHRBECK has constructed and put on the market a new form of thermostat, or apparatus for maintaining any desired temperature. This has a cylindrical shape with rounded bottom, which presents the advantage that the "dead" corners of the usual square apparatus are avoided, and that, by the more regular circulation of the heated water, a much more uniform temperature is insured. It will be noticed that the apparatus shown in the cut has several doors. The inner one has glass-windows, and permits the observation of the interior without admitting external air. The bottom part of the apparatus contains a chamber into which either a drying substance may be introduced, or some liquid for producing, when necessary, a certain amount of humidity within the apparatus. The temperature is regulated automatically by a thermo-regulator, the construction of which will be understood by examining the schematic cut. The interior heated air passes up through the tube A, surrounded by the heated water, and acts upon the mercury contained in the cylinder B. The handle C is previously adjusted so that the supply of gas from D will be shut off when the mercury rises to the predetermined temperature. Whenever the latter is reached, the main supply of gas will be shut off from the burner, but a small guiding flame will relight the latter as soon as the temperature begins to fall. By making the adjustment delicate, the oscillations in temperature may be made almost unobservable. The apparatus is further provided with a pressure and water gauge, and two thermometers—one to indicate the temperature of the water between the walls, the other that of the interior air.



Rohrbeck's Heat Regulator.

A New Compound Antiseptic.

SINCE both corrosive sublimate and carbolic acid, though in dilute solution, sometimes produce toxic symptoms, and it has been demonstrated that very much smaller quantities may be used with equal effect, if combined with other antiseptics, Dr. Emil Rotter has devised the following compound, which he states to be powerfully antiseptic, and which may be kept in form of powder or tablets, to be dissolved in water when wanted:

Corrosive Sublimate	5 parts.
Chloride of Sodium	25 "
Carbolic Acid	200 "
Chloride of Zinc	500 "
Sulphocarbolate of Zinc	500 "
Boric Acid	300 "
Salicylic Acid	60 "
Thymol	10 "
Citric Acid	10 "

A quantity of one-half troy ounce of this mixture, dissolved in one quart of ordinary well-water [which is specially mentioned to show the adaptability of the powder to campaign purposes] yields a perfectly clear liquid.

In cases where both carbolic acid and corrosive sublimate are contra-indicated, these ingredients may be omitted.—After *Therap. Monatsh.*

Sulphonal.

BAYER & CO., of Elberfeld, have succeeded in obviating one considerable inconvenience in the manufacture of sulphonal. Formerly this involved the preparation of ethyl mercaptan, which is very volatile, boiling at 36° C., and has, moreover, such a fearful odor, even when present in the atmosphere only in the slightest traces, that some of the manufacturers have had to remove their factories to remote districts, "far from the busy haunts of men." Now, sulphonal, it is found, can be manufactured from mercaptol without previous isolation of the mercaptan. According to the patent specification, 26 kilos. of thio-sulphate of ethyl and sodium sulphate are mixed with 5 kilos. of acetone and 50 kilos. of alcoholic hydrochloric acid. The whole is moderately heated, or allowed to stand for some hours in a closed vessel, when about 70% of the theoretical yield of mercaptol is produced. To the alcoholic solution water is added till all the mercaptol is separated as an oily liquid, which is directly oxidized by permanganate of potassium.—*Chem. and Drugg.*

Theophylline, a New Alkaloid from Tea.

A. KOSSEL, of Berlin, reports in the *Zeitsch. f. physiol. Chem.* (XIII., 298) that he has discovered a new base in tea. At least, Dr. F. Witte, of Rostock, forwarded to him a quantity of extract which had been prepared by exhausting tea-leaves with alcohol, concentrating to a syrupy consistence, and removing the largest part of the caffeine by crystallization. [It would be interesting to know what kind of tea the extract was prepared from. Also, whether all tea-leaves, no matter where grown, contain the alkaloid.—ED. AM. DR.]

The base was obtained in the following manner. The extract was dissolved in water, and mixed with sulphuric acid which caused the separation of a resinous sticky mass. The liquid freed from the latter was rendered strongly alkaline with ammonia and precipitated with ammoniacal silver solution. The resulting precipitate was removed by filtration and digested with warm nitric acid. On cooling, the silver salts of adenine and hypoxanthine separated. These were filtered out, and the filtrate supersaturated with ammonia, which produced a dark brown flocculent precipitate consisting of the silver salts of xanthine and the new base, theophylline. The silver was removed by distributing the precipitate in water acidulated with nitric acid, and passing hydrosulphuric acid through it. On evaporating the filtrate, xanthine was first deposited in form of an amorphous or indistinctly crystalline mass. After further concentration, crystalline needles or columnar crystals separated, which were composed of the new body, theophylline. The portion remaining in solution was recovered, as far as possible, by converting it into double mercury or silver salts, eliminating the metal, and concentrating. Finally, the base was purified by repeated crystallization.

Analysis showed that theophylline has the same chemical composition as theobromine (contained in cacao), and paraxanthine (in kola nuts). But it is *not* identical with them, as is clearly demonstrated by the author.

Lactobionic Acid.

Up to the present time, the acid corresponding to sugar of milk containing the full amount of carbon existing in the latter, had been unknown, the usual methods of oxidizing milk-sugar having always led to acids containing not more than six atoms of carbon. Emil Fischer and Jacob Meyer now announce (in *Berichte*, 1889, 361) that they have discovered the acid in question. It ought to be called lactonic acid; but as this name has already been applied to another compound, the discoverers have chosen the name lactobionic acid (from lactobiose, a synonym for milk-sugar proposed by Scheibler).

As the salts of this acid are extremely soluble in water, and it is not improbable, on theoretical grounds, that some of these salts will be made use of, either in the arts or in medicine, in place of lactates, which are much less soluble—provided there is no objection from a therapeutic standpoint—we shall describe the mode of preparation, which will no doubt be further simplified.

Dissolve 1 part of milk-sugar in 7 parts of water, and add 1 part of bromine, at the ordinary in-door temperature. Shake repeatedly during a few days, when the bromine will gradually become dissolved. After two more days, pass a strong current of air through the lukewarm liquid to drive out the greater part of the uncombined bromine, and then pass hydrosulphuric acid, so as to convert the remainder of the bromine into hydrobromic acid. Next determine the amount of the latter by titration, add enough carbonate of lead to neutralize it, filter from the precipitated bromide of lead, and remove any remaining traces of hydrobromic acid by the careful use of oxide of silver. Again filter, treat with hydrosulphuric acid to remove any traces of lead or silver, and evaporate the filtrate to a syrup. This still has a strongly reducing action upon Fehling's solution. Mix it with much cold glacial acetic acid, and triturate for some time. This causes the glacial acetic acid to take up nearly all the reducing substances, while most of the lactobionic acid remains as a tough, white mass. The product amounts to about one-third of the milk-sugar employed. To further purify it, convert the acid into the lead-salt by adding to its warm aqueous solution a hot concentrated solution of basic acetate of lead, until this ceases to produce a precipitate. (The commercial lead-salt, according to the authors, seems to be unsuited for this purpose. They made it by dissolving 2 parts of neutral acetate of lead and 1 part hydroxide of lead in 3 parts of hot water, allowing the solution to cool, and redissolving the separated crystals, in pure hot water to saturation.) Filter off the precipitated lead-salt, while hot, wash it with hot water, then suspend it in cold water, and decompose it by hydrosulphuric acid. Evaporate the filtrate to a syrup, and remove from it the little acetic acid still present by treating the mass with alcohol and ether. Dissolve the residue in water, and again precipitate with alcohol and ether.

The residuary syrup is the lactobionic acid. It is very easily soluble in water, very difficultly in alcohol and cold glacial acetic acid, and insoluble in ether. The salts are very easily soluble in water. On evaporating their aqueous solution, they remain first as a syrup, which, by keeping over sulphuric acid, dries up to a colorless, very hard mass, which is, however, easily reduced to powder, and not distinctly crystalline.

Chaulmugra.

Great strides have been made with Chaulmugra Oil in England in regard to its application to open sores, wounds, sprains, and rheumatic complaints. It is now being extensively used in veterinary cases in some of the largest stables throughout the country, being especially useful in sores resulting from friction of the harness or from bruises, which horses travelling in the metropolis (London) are all more or less subject to.

Following up the results obtained on horses, the oil has been successfully introduced as an ointment to be applied to open sores on cattle, dogs, cats, and other animals. It would seem to act by causing the wound to heal with great rapidity and cleanliness; furthermore, its use appears to keep off the flies that cause so much worry and damage.

The properties of Chaulmugra oil applied externally in bruises, sprains and stiffness, are well known to sportsmen and cyclists, while sufferers from rheumatism, and stiffness of the joints attendant upon it, derive undoubted benefit from a good rubbing with it.

Thanks to the demand now ruling for the oil, the pressers in India have been enabled to take steps to ship it in ton lots at about one-third the price which it used to cost.

The English Government have adopted it, and use it in the cavalry and artillery regiments. The German Government have not yet decided to make trials, but it is largely used by the officers. If the students would use it for the wounds on the face caused by sword cuts they would not be so marked. [We fear the students of the German Universities would give the author of this sentence the chance of trying the chaulmugra upon his own face, if they were informed of this general proposition, and could get him on the "Mensur." Had the author referred to "*some of* the students," his chances of escaping the before-mentioned fate would, of course, be greatly diminished.—Ed. Am. Dr.]

One great detriment to its easy application has always been its consistence, which, in our climate, renders it necessary to heat the oil so as to liquefy it. This has now been overcome by mixing it with *agnine*, a wool fat, with which Chaulmugra Oil combines well. This combination presents the appearance of a brown ointment, and by its means the beneficial action of the oil is more speedily obtained. The Agnine, which is readily absorbed into the skin, carries with it the Chaulmugra, and after a few seconds' rubbing not a trace of the ointment remains on the skin. Those who have had experience with the oil when used in a pure state know how slowly it is absorbed, and the uncomfortable greasiness and ungenial odor that remain. These defects are entirely avoided by the combination I have referred to.

Another very excellent combination consists in mixing Menthol and other ingredients with Chaulmugra Oil, which then remains fluid, for promptly relieving neuralgia, gouty and rheumatic pains, sciatica, and other aches of the nerves and muscles. To distinguish this from other combinations obtained with Chaulmugra Oil it has gone under the designation of *Mistole*, and as such it forms one of the most popular and efficacious remedies at present to be found in many a surgery and dispensary.—Th. Christy's *New Commercial Plants and Drugs*, No. 11.

Cold Prepared Extracts.

The idea of concentrating watery solutions by freezing is not a new one by any means. But hitherto the process has for various reasons only been applied on a small scale. Mr. L. A. Adrian, in a paper read before the Paris Chemical Society, now describes a method based upon the same principle of crystallizing out the water, whereby pharmaceutical extracts can be readily prepared in large quantities with scarcely any heat being applied. The defects of the former processes—Herrera's for instance—are that (1) barely more than 60 per cent of the water is removed by freezing, and (2) the ice separated contains 10 to 20 per cent of the active principles, be the pressure ever so powerful. M. Adrian proceeds differently. Instead of partly freezing the extractive solutions, as Herrera did, he submits them to a temperature of – 20° C. (4° Fahr. below zero) in an ammonia ice apparatus, and thus obtains solid blocks having an average temperature of – 10° C., and consequently very hard and brittle. The blocks are next passed through a peculiar shaving machine, where in less than one minute they are turned to snow, and the snow is transferred to a centrifugal extractor, which in barely twenty minutes separates out about 75 per cent of the water and but very little of the active principles. The concentrated liquid being once more treated in the same manner, only at a still lower temperature, a syrupy liquor is obtained which is concentrated enough to rapidly afford in vacuo a solid extract, without raising the temperature above 30° C. (86° F.). Experience has demonstrated that a third freezing would be useless, if not worse, as it is wasteful, and might injure the active principles. The solid extracts obtained by the foregoing process, as compared with those prepared in vacuo or by open-air evaporation, are very light colored, afford almost clear solutions with cold water, and present in a high degree the odor and the taste of the drug, without that familiar flavor of fire. The difference is especially noticeable in respect to inspissated juices of fresh plants, as in their case the vegetable albumin is not coagulated. Another point worthy of consideration is that the cold-process extracts will probably prove more active than the old-style preparations. Hence it would be well to ascertain the comparative therapeutic values of such extracts as belladonna or henbane, for instance, which are at the same time poisonous and more readily estimated. M. Adrian proposes, in a coming communication, to examine this side of the question.—*Paris Correspondent* in *Chem. and Drugg.*, March 2d.

Acetylphenylhydrazide.

According to Prof. O. Liebreich, pure acetylphenylhydrazide is reported by Prof. Dreschfeld to have an antipyretic power four times as great as that of pyrodin [one of the recently introduced antipyretics, but which has been warned against by several authorities]. Consequently the doses which Dreschfeld has indicated for pyrodin (2 to 4 grains for children, and 8 to 11 grains for adults) would be too large for acetylphenylhydrazide.

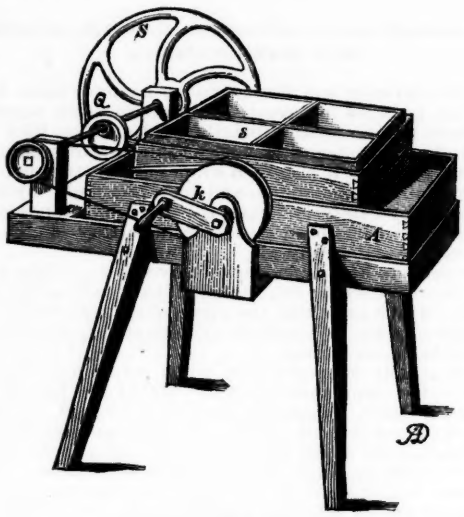
Liebreich gives the doses of the last-named substance as follows:

For children.....	½ to 1 grain.
For adults.....	2 to 3 grains.
Highest dose for adults, and per day....	4 grains.

It follows from this, that pyrodin and acetylphenylhydrazide are not identical, and that the latter may only be dispensed if it is prescribed under this name.—After *Pharm. Zeit.*

AGITATOR FOR CHEMICAL LABORATORIES.

PROF. A. STUTZER, of Bonn, describes, in the *Zeitsch. f. angew. Chemie* (1888, 698), a simple agitator or "shake apparatus" which promises to be of great use in chemical or pharmaceutical laboratories. The apparatus was originally designed for sifting certain mineral matters (Thomas slag, etc.) under normal conditions of fineness, time, etc., but its general applicability to other purposes where protracted agitation is required is almost self-evident. It is scarcely necessary to describe the apparatus, as its construction will be readily understood by examining the cut. The shuttle motion is produced by the eccentric position of the hinged wheel *Q*, attached to the front of the box.



Shake apparatus for laboratories.

As shown in the cut, the apparatus is constructed for hand-work. But in these days of progress and labor-saving devices, either an electric or a water-motor will probably be preferred, unless steam is readily available.

In some analytical operations, protracted shaking is known to produce more perfect results and in a much shorter time. Thus in the assay of opium (by Dieterich's or Squibbs' method), in the extraction of certain alkaloids by the method of immiscible solvents, and similar operations, an apparatus like that described above will be very serviceable.

Piche or Pichi.

UNDER the name of Piché, the *Fabiana imbricata* is known in Chili, Peru, and the Argentine Republic for its prompt and decisive action in diseases of the liver and in the urinary passages. This shrub, which might from its appearance be taken for a Conifer, belongs to the *Solanaceæ*, and grows on dry elevated slopes. It is remarkable for its light bluish-green branches, which contrast very much with the surrounding vegetation. The branches are subdivided into smaller ones, which are rounded, thin, covered with imbricated scales, which are really only thickened leaves, oval and acute in shape, of a length of about $\frac{1}{16}$ inch, and overlapping one another. Its flowers, which appear only in the second year, are placed at the extremity of the smaller branches, and are solitary; the calyx, which closely surrounds the ovary, is green, then yellowish, thick, with 5 long and obtuse lobes; the corolla is gamopetalous, with a tube dilated at its superior end, its throat is slightly compressed, lobes short, semicircular and small; stamens five, inserted in the tube of the corolla; anthers short, bilocular, opening longitudinally.

The fruit is oblong, ovoid, crustaceous, light brown, about two inches in length; the seeds are ovoid, nearly angular, with a crustaceous testa.

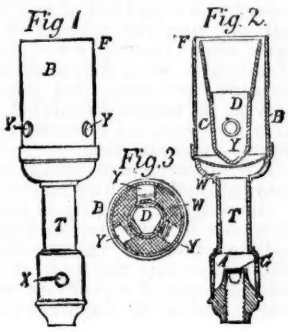
In commerce Piché consists of the stem, branches, and leafy branches; the large branches are from $\frac{3}{4}$ to $1\frac{1}{2}$ inches in diameter, covered with a thin, smooth bark, slightly wrinkled longitudinally, ash-gray in color, and having tuberculous protuberances. The smaller branches are from $\frac{1}{16}$ to $\frac{1}{4}$ inch in diameter, of a darker color than the preceding, and present at regular intervals distinct evidence of the place where the small leaves are inserted. The wood is of a yellowish-white color. All these parts of the plant are covered with a greenish or greenish-gray resin, which would appear to protect the surfaces of the plant, and so prevent the too rapid evaporation of its moisture during the very long dry seasons to which it is subject. It is now being cultivated in Europe.

Piché is especially indicated in catarrhal inflammation, renal colic, prostatitis, cystitis, musky residual urine, renal calculi, inflammation of the ureters, etc.—TH. CHRISTY'S *New Commercial Plants and Drugs*, No. 11.

BUNSEN GAS BURNERS.

THIS invention relates to the construction of a Bunsen in such a manner as to produce a circular flame with internal as well as external air supply.

The gas, entering at the bottom, passes vertically through several small holes in a thin plate, G, into a cavity, A, into which air enters through lateral apertures, X. From the cavity the gas and air ascend a tube, T, which expands at its upper end to a diameter equal to that of the desired flame. The expansion is covered by wire gauze, W, which serves to mix the gas and air, and distributes the mixture uniformly through the enlarged part, B, of the tube. The mixture then ascends an annular passage, C, formed between the external tube, B, and an internal tube or thimble, D, which is closed at its lower end, and tapers to a larger diameter at its upper end. To the lower part of the thimble there lead several inlets, Y, for air from outside the outer tube, B; these inlets being formed by short tubes crossing the annular passage, C. At F (the upper end of the tubes) the mixture of gas and air issues from the annular mouth between them; and this mixture, being ignited, forms a circular flame, which receives air, not only from the outside, but also from the interior of the thimble, D, to which the air is admitted by the inlets, Y. The upper part of the tube, B, and of the thimble, D, may be of metal. As shown, it is generally, however, preferable (says the author) to make the parts which are next the flame of steatite or such like material.—*Scient. Amer. Suppl.*



A NEW METHOD OF ESTIMATING NITRITES, EITHER ALONE OR IN PRESENCE OF NITRATES AND CHLORIDES.

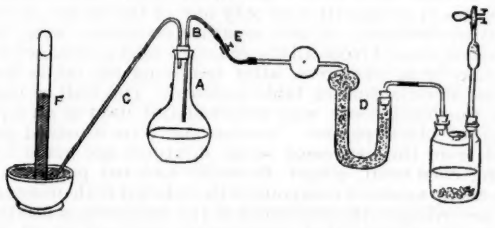
IN most text-books on chemistry a method is given for the preparation of nitrogen by heating a mixture of potassium nitrite and ammonium chloride, the change being represented by the equation

$$NO_2K + NH_4Cl = KCl + 2OH_2 + N_2,$$

which may be simplified by saying that ammonium nitrite when heated, splits up into nitrogen and water, thus: $NO_2NH_4 = N_2 + OH_2$, the quantity of nitrogen produced being exactly double that present as nitrous acid in the nitrite.

The method here given consists in applying this well-known reaction quantitatively. I have never seen any mention of the use of this reaction for quantitative purposes, and I scarcely think that a method based on its use would have been omitted in any work on analytical chemistry if accurate results had been obtained by its means.

In order to test the accuracy of the method I have devised, I prepared a quantity of pure silver nitrite, NO_2Ag, and determined the amount of nitrogen it contained, comparing the results obtained with that required by the known composition of the salt. The process is conducted in the following way:



The solution containing the nitrite is introduced into the flask *A* (Fig. 1) (about 75 C.c. capacity), and an excess of solid ammonium chloride is then added till the solution is thoroughly saturated. It is important that the solution should be concentrated, otherwise considerable difficulty will be found in driving off the last traces of nitrogen. The flask is closed by a cork carrying the capillary tube *B* and the delivery tube *C* of somewhat wider bore, 1.5 to 2.0 Mm. Carbonic anhydride, generated from white marble and hydrochloric acid, in the apparatus shown in the figure is then allowed to flow through the flask until all the air is removed. The small U-tube, *D*, is filled with glass beads moistened with a little weak potash solution,

and is intended to intercept any acid spray which may be carried over by the current of gas.

As soon as it is considered that the whole of the air in the flask is displaced by carbonic anhydride, the screw-tap *E* is closed, and the flask disconnected from the carbonic anhydride apparatus. The end of the delivery tube *C* is now brought under the graduated absorption tube *F*, which contains mercury and a few C.c. of strong potash solution to absorb the carbonic anhydride. The solution in the flask is now heated till it boils. As long as any nitrogen is given off, the boiling liquid effervesces freely, but as soon as the last traces have been expelled, the boiling assumes the peculiar bumping character noticed in water free from dissolved gas. The boiling is continued till all the nitrogen produced in the reaction has been carried over by the steam and collected in the absorption-tube. The screw-cock *E* may now be opened, while the liquid is still boiling, and the flask removed.

The absorption tube containing the collected gas is removed to a vessel full of water, the mercury is allowed to fall out, and the volume of nitrogen obtained is measured after standing a few hours. The observed volume of nitrogen, when due allowance has been made for temperature, pressure, and tension of aqueous vapor, is halved, its weight calculated, and we have then all the data necessary for calculating the amount present in the nitrite under analysis.

The following experiments will show the degree of accuracy attainable by this method:

The weighed quantity of silver nitrite was in each case dissolved in hot water, and decomposed by a solution of sodium chloride. The solution was filtered through a small filter into the flask *A*, and the precipitated silver chloride washed repeatedly with small quantities of hot water, adding the washings to the solution in the flask.

	Gm. NO_2Ag.		Gm. N. Half vol.	C.c.N.	C.c.N.NO_2Ag. Theory.	C.c.
Expt. 1.	0.1364	gave	0.012136 =	8.90	9.02.	Loss, 0.12.
Expt. 2.	0.1700	gave	0.015579 =	9.12	9.02.	Gain, 0.10.
Expt. 3.	0.1712	gave	0.015452 =	9.02	9.02.	Exact.

I repeated the determinations in presence of excess of potassium nitrate. About 0.5 Gm. of this salt was added to the solution in each experiment:

	Gm. NO_2Ag.		Gm. N. Half vol.	C.c.N.	C.c.N.NO_2Ag. Theory.	C.c.
Expt. 1.	0.1716	gave	0.015455 =	9.12	9.02.	Gain, 0.10.
Expt. 2.	0.1808	gave	0.016556 =	9.16	9.02.	Gain, 0.14.

The results of these two experiments show that the presence of the nitrate does not affect the accuracy of the determination.—T. CUTHBERT DAY in *Journ. Chem. Soc.*, 1888, 422.

The Adulteration of Spices.

IN the report of the Dairy Commissioner of the State of New Jersey for 1888, just issued, Dr. Wm. K. Newton, the Commissioner, quotes from a letter of Dr. E. H. Bartley, of the Brooklyn Board of Health, as follows:

"Both of the mills [spice-mills] I visited have salesrooms in New York, while the grinding only is done here. According to their own statement, a very considerable proportion of the cheap mixtures made by them are sold to the trade, and are not sold under the firm name; that is, these mixtures are prepared in the mills and sold in bulk to other firms, who put them up in packages and sell to retailers, or ship in bulk to western cities. It is, therefore, not easy to trace a large part of these adulterated goods after they leave the mills. That they reach the market is certain, because they would not be manufactured for any other purpose. The information here given is based upon what I saw in the mills. Mustard was in process of preparation at only one of the mills. So far as my observation, on two separate occasions, went, the oil was expressed from all the mustard used in the factory. The cake from the press, after removing the oil, is used for the manufacture of table mustard. The hull or chaff from the black seeds was removed and used as an adulterant of black pepper. Besides the pure mustard prepared from the expressed seeds, mixtures are made containing corn meal, ginger, turmeric and red pepper. In some cheap mustard compounds there is but little mustard, and, according to the statement of the workmen, a mixture is sometimes made that contains no mustard at all, the pungency being obtained by the addition of cayenne pepper. Ginger was being prepared of several grades, varying from the pure article to those containing none at all. The adulterants used were corn-flour, corn-meal, pilot biscuit and cayenne pepper. In one of the mills I was shown a very good imitation of ground ginger, but which contained no ginger whatever. I was unable to learn for whom this was made, but was informed that there was a demand for it, and that it was used by the compounders. Cloves were seen in the process of grinding; they were mixed with burnt or charred walnut shells, to the extent of 50 per cent. Cinnamon is cheapened by the addition of ground almond and cocoanut shells. In order to brighten the color of this mixture, a small amount of sienna is added. In some cases the cinnamon bark is ground alone, but in all the above mixtures which I saw in process of preparation, the cinnamon buds were mixed with the bark before grinding. There were very large quantities of ground cocoanut shells used in the factory. A very small amount of cayenne pepper is used to increase the pungency of these reduced cinnamon mixtures. I was shown several barrels of pepper compound, which was a very good imitation of ground pepper; it, however, contained no trace of pepper. This article was for shipment to New York, to be used for the purpose of 'reducing' ground pepper. Following is a list of articles used at this mill for adulteration: Cocoanut shells, natural and charred, walnut shells, corn-meal, buckwheat hulls and middlings, mustard chaff, ground charcoal and cayenne pepper."

The Decomposition of Potassium Chlorate in Contact with Metallic Oxides.

DR. HODGKINSON and Mr. Lowndes have for some time past been engaged in investigating the reaction between chlorate of potassium and metallic oxides, when they are subjected to heat, together, for the purpose of producing oxygen. Hitherto it has been supposed that the metallic oxide remained unchanged, and merely acted "by contact," or "by catalysis;" that is—so it was supposed—it rendered the decomposition of the molecules of chlorate more regular and steady.

The chemists above mentioned have now published (in *Chem. News*, February 8th,) some of the results of their researches, which show that the views so far entertained are not quite correct. We will give the summary of their results in their own words:

"It is usually supposed that when potassium chlorate ($KClO_3$) and manganese dioxide (MnO_2) are heated together, the MnO_2 remains as such in the vessel, together with potassium chloride (KCl). In only exceptional cases does this appear to be the case. The manganese is to a greater or less extent in the form of lower oxides. Only when the mixture has been heated until the whole of the oxygen is driven off, and a gentle heat maintained for some time, is the manganese completely re-oxidized. In one case only out of a number of fourteen or fifteen, were we able, by continuous heating, to obtain MnO_2. In this series of experiments, a weighed quantity of pure potassium chlorate was heated with a weighed amount of manganese dioxide, in a cleaned, weighed test-tube. The residue in the tube was weighed after cooling." [It was found to correspond in weight with the theoretical amount of KCl and MnO_2, within 0.0006 Gm., a difference which is well within the limits of analytical errors.]

Gelsemine vs. Gelsemin.

A NEARLY fatal case of poisoning recently occurred on the Continent of Europe through the dispensing of the alkaloid gelsemine in place of the eclectic resinoid "gelsemin." Dr. Myrtle, of Harrowgate, had been consulted, by letter, by one of his patients travelling upon the Continent, and ordered for her the following prescription:

Quin. Salicyl.	gr. 2
Ext. Colch. Acet.	" $\frac{1}{6}$
Gelsemin	" $\frac{1}{10}$
Morph. Hydrochlor.	" $\frac{1}{4}$

Ft. pil. 1. Mitte tal. xii. One to be taken every three hours.

The first pill produced very alarming symptoms, and it was ascertained that the pharmacist who dispensed the prescription had used one-tenth grain of the hydrochlorate of gelsemine. Dr. Myrtle subsequently found fault with the dispenser for not knowing that he, the prescriber, could not have meant the powerful alkaloid gelsemine, but rather intended the eclectic resinoid "gelsemin." He also finds—perhaps he had never noticed it before—that the terms of the "resinoids," ending in *-in*, and those of the alkaloids, ending in *-ina* or *-ine*, are too similar, and he wants this to be changed at once. (*After Chem. and Drugg.*)

Note by Ed. Am. Drugg.—Surely the proper way to "change this" will be by physicians never prescribing the eclectic resinoids, at all events in such cases where the crude drug contains both alkaloids and glucoside; for instance, in the case of hyoscyamus, digitalis, etc. As it is not likely, however, that many physicians will remember these cases, it would be well for them to drop the resinoids ending in *-in* on principle. Probably *one* of these, at least, will survive, namely, "podophyllin," and possibly also "leptandrin" and "euonymin," until such time as the active principles are obtainable in a pure form. But if any physician should write in a prescription,

Digitalin.....gr. 1

intending to mean the resinoid, and if the pharmacist were to dispense the active principle "digitalin," the blame would rest upon the physician, and scarcely at all upon the dispenser, particularly if the dose were not distinctly specified.

AN IMPROVED MICROSCOPE-LAMP.

THE well-known optical principle of total reflection has been applied to the construction of a novel lamp for microscopic use.

A lamp giving a bright light is used as the source. The lamp is completely covered so as not to diffuse any light laterally. When a transparent object is to be illuminated on the stage, a doubly-curved glass-rod, like that shown in the cut, is inserted through a lateral tube into an opening in the lamp case, the outer end of the glass tube is brought under the slide, and the latter receives thus the full light of the lamp, which passes through the rod. This mode of illumination has the additional advantage that the light is not accompanied by heat.

When opaque objects are to be illuminated, which must be done from above, a simply-curved glass rod is substituted for that shown in the cut.

This lamp has been patented by Dr. W. Kochs and Max Wolz, of Bonn, and is for sale by Richard Fingerutt & Co., 4th Ave. and 28th st., New York.

TESTING FILTERING PAPER.

IN testing filtering paper, one feature, among others, should be specially paid attention to, namely the rapidity with which liquid will spread over a given surface. This may be ascertained by fastening to a frame a series of equal strips of various filtering papers, and then immersing them simultaneously in water. The exact time of immersion being noticed, it only remains to wait until upward diffusion stops, and then to read off, on the scale to which each strip is fastened, the degree or mark to which diffusion extended.—WINCKLER in *Papier-Zeit.* and *Z. angew. Chem.*

Note on Green Euonymin.

A SAMPLE of green euonymin came into my hands about a week ago which had a peculiar odor and appearance. I therefore made an analysis. The result fully proved my suspicion that it was adulterated to a large extent. It was of foreign manufacture, and represents a large bulk of the green euonymin now in the market.

Physical appearance: A rather light, somewhat sticky powder, of a pea-green color, with small black particles, as if a mixture of two substances, and of a peculiar heavy odor.

Under the microscope, the "euonymin" was seen to consist of a large percentage of lycopodium colored green; the black particles had no definite formation. Broken, transparent, colorless crystals were also observed, which were very slowly dissolved by a drop of water placed upon the slide. A drop of solution of potash dissolved them immediately.

An analysis was made, with the following result:

	Per cent.
Lycopodium	29.8
Dark green resin, consisting chiefly of ext. Indian hemp	15.2
Water extract: bitter extractive matter	20.6
Sugar of milk	30.0
Water	4.4
Total	100.0
Ash	1.2

The following remarks regarding the analysis may be of interest: 2.5 Gms. were dried on water-bath for moisture, then ignited for ash; 2.5 Gms. were added to 20 C.c. hot water, when the characteristic odor of Indian hemp was at once recognized. It was stirred, filtered and washed until the washings were colorless, the residue dried, and weighed. Loss: Water previously determined and water extract.

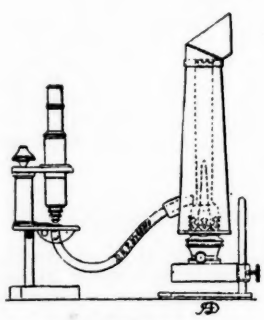
The solution was of a very light color considering amount of matter extracted, neutral to test paper, and of bitter taste.

The behavior of the crystals under the microscope with potash solution and the low percentage of ash led me to suspect sugar of milk, which was confirmed by Fehling's solution. The quantity present was estimated by Fehling's solution, standardized by sugar of milk.

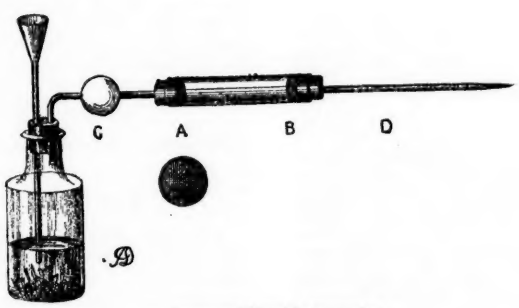
The bright green residue left after extracting with water was exhausted with hot spirit until all green coloring matter was dissolved; residue dried and weighed. The residue was of a light yellow color, and under the microscope was seen to consist entirely of lycopodium.

On evaporating the spirituous extract in a water-bath, a green resin was left, having the odor and all characteristics of extract of Indian hemp, and constituted 15.2%.

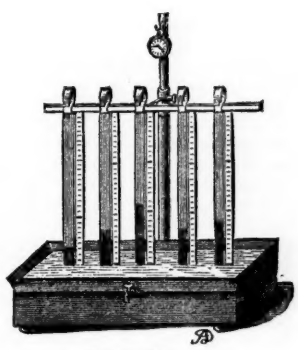
The above analysis tends to confirm several notes that have previously been published condemning green euonymin as being unsatisfactory and often inert. There is little doubt that the brown is usually much superior to the green variety now in the market.—H. S. COLLINS, *Chem. and Drug.*, March 9th, 1889.



Microscope lamp.



Improved Marsh's apparatus.



Testing filter-paper.

IMPROVEMENT IN MARSH'S APPARATUS.

DR. CANUDAS Y SALADA, of Barcelona, proposes a simple contrivance to do away with the risk of explosion when igniting the hydrogen issuing from Marsh's apparatus. It consists in several discs of wire-gauze placed into a tube of larger calibre than the exit tube of the gas. These discs are mounted in rubber rings, and placed at the extremity of either end of the larger tube so as not to leave any space between them and the rubber-stoppers. The accompanying illustration explains the arrangement. —After *L'Union Pharm.*, 1888, 442.

Easy Preparation of Oxygen.

DR. G. DENIGÉS, of the Bordeaux Pharmaceutical Society, has proposed for preparing oxygen a ready method, which may not answer for operations on the industrial scale, but will possibly be found convenient in a pharmacist's modest laboratory. The process is as follows: In an 8 oz. mattress introduce 40 C.c. of soap-maker's soda-lye, as much water, and 2 or 3 C.c. of concentrated solution of cupric sulphate. The cupric oxide at first precipitated is re-dissolved in the excess of alkali. The blue liquor is now heated to ebullition, and the mattress, on being removed from the fire, is closed with a cork provided with two glass tubes. One is for letting out the gas, and the other, having a glass cock, contains 10 C.c. of bromine. On causing the metalloid to come down drop by drop into the blue liquor, a continuous stream of oxygen will be evolved, easily regulated by means of the bromine cock. Near the end of the operation, should the liquid become too cool, it may be necessary to heat it gently to 60° or 80° C., which is the most convenient temperature for the operation. The following represents the reaction:

$$2Br + 2NaOH = 2NaBr + H_2O + O$$

The cupric oxide takes no direct part in the chemical changes, but acts in the same way as cobalt and nickel oxides are known to do with hypochlorites, namely, owing to simple presence. Ten C.c. of bromine, weighing 29 grammes, will, with the foregoing process, afford about 1,800 C.c. of oxygen, or nearly nine-tenths of the theoretical quantity.—*Chem. and Drugg.*

Death from Atropine.

THOUGH atropine is a most decided and energetic poison, the number of deaths from excessive doses of it is comparatively small, most cases of poisoning by it, which received timely medical treatment, having eventually recovered. A fatal case, however, recently happened at Barcelonette, France. The subprefect, who suffered from migraine, had consulted his brother, who was a physician, and the latter prescribed for him 1 gramme of antipyrine. The prescription, written hurriedly with lead-pencil, was sent to the apothecary Mr. Richaud, in whose absence his sister prepared to dispense it. But she read the prescription as "Atropine" 1 gramme. Upon Mr. Richaud's return the error was discovered, but it was too late. The subprefect had taken the dose, and all efforts to save his life proved futile.

Strophanthin.

THE crushed seeds of *Strophanthus Kombé* are treated with boiling alcohol of 70° for several hours, and the solution distilled to a small bulk on a water-bath; the distillation is finished in a vacuum, care being taken that the extract remains liquid. The residue is cooled, the supernatant oil and resin separated, the liquid filtered and heated with a small quantity of basic lead acetate and more finely powdered litharge. The liquid is again filtered, the lead removed by means of hydrogen sulphide, and the filtrate concentrated at 50° to a thick syrup, from which the strophanthin slowly crystallizes. The crystals may be purified by recrystallization from boiling water. The yield is 4.5 grammes per kilo.

Strophanthin is a white, bitter substance, which crystallizes in white, micaceous plates grouped around a nucleus. It readily retains water mechanically, and also forms a hydrate, which loses its water in a vacuum or in dry air. The hydrate melts below 100°, and the residual strophanthin is uncrystallizable. If, however, strophanthin is carefully dried in a vacuum, it may be heated at 110° without alteration. Anhydrous strophanthin becomes pasty at 165°, and partially decomposes. It acts on polarized light; the rotary power of a 2.3% aqueous solution $[\alpha]\ D = +30°$. It is only slightly soluble in water, and somewhat soluble in alcohol, but it is insoluble in ether, carbon bisulphide, and benzene. It is precipitated from its aqueous solution by tannin.

Strophanthin contains no nitrogen, and has a composition corresponding with the formula $C_{21}H_{46}O_{12}$. It seems to be the immediate higher homologue of oubaïn, which it closely resembles in properties. Perhaps these and all other cardiac poisons have a common nucleus.—*Am. Jour. Pharm.* from *Compt. rend.*, cvii., 179.

A New Adulteration of Spanish Saffron.

ADRIAN reports a new sophistication of saffron which appears to be very remarkable. On inspection the saffron did not show the least trace of the admixture of foreign substances; it had a remarkably bright color and a very aromatic odor. Nevertheless, it presented some physical peculiarities which attracted attention to it. It was heavy, though washing with water did not detach any insoluble matter. It was also very hygroscopic: if strongly rubbed upon white paper, it colored the latter yellow; and if compressed between the fingers so as to form a sort of ball, it retained this shape, while genuine saffron is quite elastic, and returns to its former loose-fibred state. The yellow fibres which are always found in saffron, and which are a portion of the style adhering to the stigmas, appeared to be few in number, though they could be recognized.

Examination showed that while pure saffron yielded 7.145% of ash, the suspected yielded not less than 26.4%. The latter was analyzed, and the different constituents having been combined in the manner usual in analysis, led the author to regard the original adulterant as being present in the following proportions:

Borate of Sodium, cryst.	13.990
Sulphate of Sodium, cryst.	11.285
Tartrate of Potassium	10.096
Chloride of Sodium	0.117
Nitrate of Ammonium	3.142

Allowance was made for the salts found to occur in the ash of pure saffron, and the tartrate of potassium was *assumed* to have been originally present, while, of course, the ash showed only a carbonate.—After *Journ. de Pharm.*, Nov. 3d, 1889, 98.

Purification of Amylic Alcohol.

WHEN amylic alcohol is used, in chemical operations, as a solvent, particularly for extracting or dissolving coloring matters from acid liquids, it is often noticed that it becomes partly decomposed or resinified. At least, this is the experience of Dr. L. v. Udransky. Commercial amylic alcohol, as is well known, is a mixture of several isomeric alcohols, but for chemical purposes this is usually immaterial, so long as it is free from certain impurities, which themselves can originate a coloring matter. The most objectionable of these impurities is furfurol.

After various experiments the author found that the latter is best removed in the following manner.

Prepare amylosulphate (sulphamylate) of potassium in the same manner as sulphethylate (sulphovinates) are obtained. Dissolve the salt in a small quantity of warm, pure alcohol, and precipitate it with a large excess of pure ether. It is thus obtained in form of crystalline laminæ. Repeat this process 3 or 4 times. Then place the salt into a flask, cover it with a 10% sulphuric acid, and heat, under an upright condenser, during 5 hours on a steam-bath. Remove the separated amylic alcohol, shake it with calcium carbonate, separate it again and distil it with steam.

Amylic alcohol thus prepared is perfectly free from furfurol. The latter would be readily detected by adding a little of it to concentrated sulphuric acid containing alpha-naphthol in solution, which assumes a more or less colored (red) tint if furfurol is present.

While ordinary amylic alcohol, when shaken with cold and concentrated, or hot and diluted solution of soda, acquires a tint itself and causes the alkali solution to become likewise colored, no such coloration is produced if the purified alcohol is employed. If the latter is free from furfurol, it may be boiled for any length of time with concentrated solution of soda without showing any change of color. It may also be left in contact with acids, and exposed to the light.—After *Zeitsch. f. phys. Chem.*, XIII., 248.

Remedies in Cocaine-poisoning.

MORPHINE is to some extent an antagonist to cocaine, as it is to atropine; but no beneficial results appear to follow the administration of opium or morphine in cocaine-poisoning, even in large doses. Nitrite of amyl has been recommended as an antidote; it dilates the peripheral vessels, while cocaine contracts them. In cases of poisoning, however, it does not appear to have been of much use. The chief symptoms in severe cocaine-poisoning are referable to the nervous system; these are unconsciousness and convulsions. The latter, which are clonic in character, are cerebral in origin, since they are not produced in animals if the spinal cord be divided. However, death occurs either from respiratory paralysis or, perhaps more frequently, from tetanus of the respiratory muscles. Cocaine, in fact, acts upon the central nervous system from above downwards; it first affects the cerebral hemispheres, then the medulla oblongata, and finally the spinal cord. Chloral hydrate antagonizes all the actions of cocaine, except the rise of temperature. Although chloral itself produces a great fall of body temperature, it does not counteract the rise produced by cocaine. In poisoning by this alkaloid, Mosso, as the result of numerous experiments, advises the inhalation of ether or chloroform; in this way death by respiratory tetanus is prevented. When the patient is recovering somewhat, chloral in small doses may be administered. But prevention is better than cure, and there is no doubt that as great care ought to be taken in using cocaine for its local anæsthetic effect as in the exhibition of any other powerful drug, and especially is this the case when it is injected hypodermically.—*Chem. and Drugg.*

New Method of Purifying Alcohol.

A PATENT has been granted to Ernst Holz, of Berlin, for a new process by which amylic and other higher homologues of ordinary (ethylic alcohol) may be removed therefrom. The process consists in passing the hot alcohol vapors through a boiling alkaline solution of copper, interposed between the still proper and the condenser. A solution similar to that made after Fehling's plan may be used. Any amylic compounds which accompany the alcohol are thereby oxidized (under simultaneous reduction of the copper to cuprous oxide) into the corresponding fatty acids (valerianic, butyric, propionic), which immediately combine with the alkali present and are thus retained in the liquid. The alcohol itself is said not to be affected in the least by the copper solution. When the solution is spent, the ingredients may be reworked and used over again.

A New Kind of India Ink.

THE following communication was recently addressed by B. Piffard to the Editor of the *Chemical News:*

"I find that a color apparently identical with India ink can be produced by the action of sulphuric acid on camphor.

An excess of camphor should remain some 24 hours in strong sulphuric acid; it then results in a gelatinous mass of a slightly reddish color. This, when heated, effervesces, gives off fumes of sulphurous acid, and turns intensely black. By evaporation, the superfluous sulphuric acid and camphor (for there remains an excess of both, the weakened acid not acting on the camphor) can be driven off. The remainder, when applied to paper as a paint, appears, to my unartistic eye, to be India ink. When dissolved in water, it remains an indefinite time without precipitating. It appears to be dissolved, not held in suspension."

Interchange of Certificates of Pharmacy Boards.—The Wisconsin State Board has adopted a resolution to "grant full certificates to all licentiates of other States whose examinations correspond with that of Wisconsin, and if the applicant gives proof that he has had five years' practical experience and passed a successful examination. The secretary of the Wisconsin Board will register and issue certificates to such applicants when above proof is furnished and a fee of $2.00 paid for registration. An assistant's certificate is granted to those having less than five years' experience."

Adulterated Drugs.

FROM the last report (1888) of Dairy Commissioner Dr. Wm. K. Newton, of New Jersey, we take the following notes on various drugs and chemicals.

Bicarbonate of Sodium.

Twenty-eight samples were analyzed, of which nineteen were equal to the legal requirements and nine were impure. The United States Pharmacopœia recognizes two qualities—one, the pure bicarbonate of sodium, used for internal medication; the other, commercial bicarbonate of sodium. In applying the tests required by the authorities, we were governed by the source whence the sample was obtained. If from a druggist, it was presumed to be the variety used in medicine, and all impurities were sought for; if from a grocer, the sample was expected to conform to the tests prescribed for a commercial article. Little excuse may be offered for the presence of impure sodium bicarbonate in any store in this State, for the pure article may be easily purchased, and at as low a figure as the debased. The chief impurities were sulphates and chlorides; in a few instances there was an excess of carbonate.

Cream of Tartar.

Ninety-five samples of cream of tartar were analyzed, of which forty-six were standard and forty-nine impure. This result I had expected, for few articles are so commonly debased as this one.

The Pharmacopœia requires that this substance shall be at least 94% pure, a limit unnecessarily liberal, for cream of tartar containing but one-half of one per cent of impurity is easily obtained.* The standard article, as required by law, must contain no sulphate or chloride, and not more than 6% of tartrate [of calcium].

The adulterations detected, in the greater number of debased samples, were clearly intentional, and were not due to lack of care in the methods of manufacture. An excess of tartrate or traces of chloride may well be considered as due to want of skill or lack of care in the maker, but the presence of sulphates, phosphates, alum, and flour can be accounted for in one way only—that is, they were added for fraudulent purposes.

Several unique samples were examined. One, purchased at Beverly, contained no cream of tartar, but was a mixture of flour, acid phosphate of lime, and sulphate of lime; another sample of the same kind was sold to one of my agents at Cape May. A sample was sold by a dealer at Pemberton that proved to be a mixture of alum, phosphate of lime, and 64% of cream of tartar. Several were obtained in different parts of the State that were adulterated with impure acid phosphate of lime.

The samples that were equal to the standard were, in at least 90% of the cases, obtained from druggists, but many from this source were badly debased.

The impure cream of tartar obtained in this State came largely from the southern and western sections, and was sold to dealers by agents and jobbers from Philadelphia. There appears to be a certain relation between the fertilizer trade in that city and the bogus cream of tartar business, the connection probably being due to the trade in impure phosphates.

Two suits were instituted against dealers in the very impure article, these being settled on the payment of costs when the dealer promised to return the adulterated article to the wholesale dealer and to sell only the pure article. Warning notices were sent to all other dealers detected in selling adulterated cream of tartar.

Iodide of Potassium.

Fifteen samples of iodide of potassium were examined, of which four were equal to the requirements of the United States Pharmacopœia, and eleven were impure, according to the tests directed by that authority. The impurities were excess of alkalinity, presence of undue quantities of iodate and traces of carbonate. As was said in connection with other articles, the large number of impure samples can be accounted for by lack of care by the manufacturers and improper methods of purchase by the dealer. The excess of alkali and the presence of carbonate is due to what seems a desire on the part of the maker to produce a fine-looking crystal, with a translucent, waxy appearance. It is possible to produce, and to purchase, iodide of potassium answering all the tests of the Pharmacopœia.

Seidlitz Powders.

Twenty-eight of these powders were examined, of which twelve were equal to the requirements of the law, and sixteen were deficient. The quality of the ingredients was found to be good, but the deficiency was all due to errors in weighing the substances entering into the composition of these powders. It is the custom with many apothecaries to buy Seidlitz powders in large quantities from manufacturers who make a business of preparing them, and dealers of good reputation may be relied on to sell a correctly compounded article. Others, on the other hand, competing in price, reduce the weight of the ingredients to such an extent that a profit is insured. This popular aperient is sold also by fancy-goods dealers, and even in dry-goods stores, in our large cities, and they sell the powders as they would other articles, simply for the profit, caring little for the quality or weight of the ingredients.

The dose contained in one of these powders has been accurately ascertained, and any reduction in the quantity is not only fraudulent but injurious.

The United States Pharmacopœia prescribes that the contents of the white paper shall weigh 35 grains, and the contents of the blue paper 160 grains.

(The appended table shows a variation, in the "white paper" powder from 18 to 42 grains, and in the "blue" from 107 to 170 grains.)

Compound Spirit of Ether.

Nine samples were examined, of which one was equal to the legal standard and eight were inferior.

The Pharmacopœia states that compound spirit of ether shall contain 3 per cent of ethereal oil or heavy oil of wine. This is an essential ingredient, and one that gives to the compound its therapeutic value. In former times this preparation was much used by physicians, but of late it has fallen into disuse, because the required effects were not obtained. This failure as a medicament, and consequent disuse by the profession, is no doubt due to the fraudulent method of preparation now so common. The chief reason for the omission of the active ingredient is that it costs $25 a pound, hence druggists do not buy the ethereal oil, but sell an article not answering to the pharmacopœial requirements.

Spirit of Nitrous Ether.

Nine samples were examined, of which none were equal to the legal requirements. The same remarks may be made with regard to the sweet spirit of nitre as were made in connection with the previous article; it is extremely difficult to obtain a specimen having the qualities demanded by the Pharmacopœia. In the case of this drug the difficulty is due to the lack of care in its preparation, and also to the faulty methods used to preserve it when made, for it is a very delicate article, and should be kept in small, well-stopped bottles and excluded from the light. It is proper to state, however, that the tests given in the Pharmacopœia are inaccurate, and that sweet spirit of nitre made strictly in accordance with the official formula will not always respond to these tests, even if applied to the spirit immediately after manufacture.

Tincture of Opium.

Forty-two samples of this tincture were analyzed. Eight of these were standard, and thirty-four did not contain the quantity of morphine required by the United States Pharmacopœia. That authority directs that tincture of opium shall be made of the powdered drug in the proportion of ten parts to 100 of the finished product, and as standard powdered opium contains not less than 12 per cent and not more than 16 per cent of morphine, the tincture must contain at least 1.20 per cent and not more than 1.60 per cent of the active ingredient—morphine. Hence, an ounce of laudanum should have in it, on the average, about 6 grains of morphine.

The law requires that articles described in the Pharmacopœia shall in no way differ from the standard of strength, quality, or purity laid down therein; hence, any tincture of opium not equal to the standard cannot legally be sold in this State.

The importance of adhering closely to the official formula, and of employing only a drug of standard strength in the preparation of this tincture, must be conceded by all, for no more potent medicament is used so commonly as laudanum. The necessity of standard strength must be patent to all, for if a physician is accustomed to prescribe a well-made tincture of opium he obtains constant results, but if the patient is supplied with an inferior article, or one stronger than the standard, disappointing or dangerous results ensue.

The causes of the great discrepancy of so many samples are many and easily ascertained. A weak tincture may be due, when made of opium of minimum strength, to the fact that the drug is not thoroughly exhausted; or gum-opium has been used, contrary to the formula of the Pharmacopœia; or opium of inferior strength has been used; or other formulæ than the official one have been followed; or the tincture has been made weak intentionally.

A large number of the samples assayed were bought at stores through the rural sections of the State, and all of these were below the standard. Those bought at regular drug stores managed by registered pharmacists were more close to the limit, but too many were below the legal standard. In the latter case no proper excuse can be offered, for a person holding the license of the State Board of Pharmacy is reasonably presumed to be conversant with the requirements of the authorities.

*This is indeed true now, but it was by no means the case when the pharmacopœia was last revised. The great improvement in processes, and consequently in purity, occurred subsequent to the issue of the last pharmacopœia. —ED. AM. DR.

My investigation, in this relation, revealed many important facts concerning the prevalence of the opium habit, and I was surprised to learn the amount of this potent drug, and its tincture, that is sold at country grocery stores; but that the consumption of this article is great, and increasing, was no surprise to me when I ascertained how easily the article could be obtained notwithstanding the State law that bottles containing the tincture should be labeled and not disposed of to irresponsible persons.

On the Testing of Lard for Cotton-Seed Oil and Beef Stearin.

THE following paper on this subject was read by John Pattison, F.I.C., at a recent meeting of the Society of Chemical Industry:

As much attention has recently been drawn to the prevalence of lard adulteration, I thought it would interest some of our members if I described briefly some of the methods by which these adulterations are detected and measured.

Although chemists have only lately been able to speak with certainty as to these adulterations, it has for some years been well known that lard, which ought to consist only of the fat of the pig, is very largely adulterated with cotton-seed oil and beef stearin, and occasionally with water. Some of the American lard packers are the greatest offenders in this respect; but they are not the only offenders, for well authenticated cases are known in which both English and Irish prepared lards have been found to contain similar adulterations.

To detect cotton-seed oil and beef stearin in lard and to form an estimate of the quantity, the following tests are chiefly relied on: Some form of the nitrate of silver tests for cotton-seed oil, the microscopical appearance of the crystals formed from an ethereal solution of the lard to detect beef stearin, the iodine absorption equivalent, and the specific gravity. Useful information is also afforded by an examination of the color, taste, smell, and consistence of the lard.

The Nitrate of Silver Test.—This is based on the reducing action of cotton seed oil upon nitrate of silver imparting a color to the lard. I have been unable to obtain constant or trustworthy results with this test as applied by Becchi [see, however, regarding this, AMER. DRUGG., 1888, 110], who, I believe, first proposed it, nor have I been more successful with the more complicated modification of Milliau, which consists in applying the test to the fatty acids separated from the lard, nor with the several other modifications of this test which have been published. I obtain, however, very regular and certain results by adding an alcoholic solution of nitrate of silver to an ethereal solution of the lard. The method is as follows: 40 drops of the melted lard are placed in a test-tube, and dissolved in 10 C.c. of ether, and to the solution 2 C.c. of an alcoholic solution of nitrate of silver (1 of nitrate of silver to 100 of alcohol) are added. The tube and its contents are left to stand for five or six hours in a place protected from light. If the lard contains cotton-seed oil, the silver is reduced and imparts a maroon color to the solution—the depth of the color depending on the proportion of cotton-seed oil the sample contains. By comparing this color with the colors produced in solutions of pure lard to which known percentages of cotton-seed oil have been added, a close approximation to the amount of cotton-seed oil in the sample can be obtained. Five per cent of cotton-seed oil in lard can be readily detected by this method.

Test for Beef Stearin.—The positive evidence of the presence of this substance in lard is best obtained by examining under a microscope the crystals formed from an ethereal solution of the lard, as proposed by Dr. Belfield, of Chicago. For this purpose I use the ethereal solution of the lard mentioned in the last paragraph. Should crystals not form in the cold solution, the cork of the tube is removed and a loose plug of cotton wool is substituted. The solution is then left to evaporate spontaneously until crystals form. It is sometimes necessary to redissolve the crystals, if they have been formed rapidly, by warming the solution, and sometimes adding a little more ether, so as to obtain crystals which have been slowly formed. Some of the crystals are then removed by a pipette, placed under a microscopic slide, and examined. The crystals of beef stearin form curved tufts somewhat of the shape of the short tail of the horse. The terminals should be pointed and hair-like. Lard crystals are usually found in oblong plates, occasionally radiated, and have oblique terminals.

The Iodine Absorption Test.—This was first described by Hübl, whose method is given in the *J. Soc. Chem. Ind.*, 1884, page 641 [and in most works of reference]. According to my experience with lards of known purity, I find the iodine absorption equivalent of pure lard when tested by Hübl's method, to vary from 57 to 63 per cent, and cotton-seed oil to vary from 105 to 116 per cent. Were the lards to be examined for only mixtures of cotton seed oil and lard, it would be easy to arrive at a fairly close approximation to the actual amounts of each present from this test alone. This, however, is never the case, as probably all lards which contain cotton-seed oil have also had beef stearin added to make the mixture of a suitable consistency. Beef stearin has an iodine absorption of from 23 to 28 per cent, while beef fat, which may also have been used as an adulterant, has an iodine absorption of about 41 per cent. This, unfortunately, complicates the calculation of percentage amounts of impurity from the iodine absorption equivalents. Most of the adulterated samples, however, have hitherto contained cotton-seed oil in such large quantity, and the iodine equivalent is so high, that a very substantial adulteration can be certified to without taking into account the effect of the beef stearin. When, however, the amount of cotton-seed oil is ascertained by the nitrate of silver test, a near approach to the amount of beef stearin also present can be calculated from the iodine absorption, after making allowance for the influence of the known quantity of cotton-seed oil. If the lard is found to be a mixture of lard and beef stearin or beef fat without cotton-seed oil, the calculation of the proportions of each is simplified; but as at present there are no known means of distinguishing beef stearin from beef fat in lard, it is necessary to calculate from the lower iodine absorption of beef stearin, and thus the amount of beef stearin may be understated. If the iodine absorption of such a lard be found to be 42 per cent, it will be safe to conclude that the lard contains one-half beef stearin and one-half lard, calculating the pure lard iodine equivalent at 61, and that of the beef stearin at 23 per cent, as $61 + 23 \div 2 = 42$.

The Specific Gravity Test is also a useful corroboration of the other tests, for cotton-seed oil is higher in density than lard or stearin. It is customary to take the gravity at a temperature of 210° Fahr. as compared with water at 60° Fahr., and this is best done with a Westphahl balance. At 210° Fahr. pure lard has a gravity varying from 0.860 to 0.861, cotton-seed oil is 0.868, and beef stearin 0.857. Lard adulterated with cotton-seed oil is usually comparatively high in gravity. Some adulterated samples which have come under my notice have had a gravity of 0.8635.

Mr. Jones, of Wolverhampton, has suggested in the *Analyst* for September last a qualitative test for cotton-seed oil based on the stiffening effect which such oil imparts to a mixture of lard when sulphur chloride is added to it. This is a useful corroborative test.

Should the lard contain water, this is readily ascertained by the crackling effect produced when a portion of the lard is thrown on a red-hot fire, or into a red-hot platinum dish. Its amount is determined by drying at 212° Fahr. a known weight of the lard in a flat-bottomed straight-sided dish until it ceases to lose weight.

It is satisfactory to be able to state that, in this district at any rate, the cotton-seed oil adulteration of lard is now seldom or never met with. This is owing to the prompt action which the authorities have taken in the matter, and also no doubt to the desire of wholesale dealers to avoid purchasing such lard now that they know of the existence of the adulteration. There are still many samples to be met with which contain very large admixtures of beef stearin and beef fat.—After *J. Soc. Chem. Ind.*, 1889, 30.

Testing the Purity of Reagents.

[Continued from page 44.]*

11. *Acidum Sulphuricum purissimum.*

Spec. grav. 1.840. Clear and colorless.

On evaporating 10 Gm. in a platinum vessel, no weighable residue should remain.

Test for Nitric Acid: To 100 Gm. of the acid add one drop of solution of indigo previously diluted with 10 vol. of water, and then add 100 C.c. of water. Even on longer standing the color should not be discharged.

The author has made careful comparative trials of the tests for nitric acid, by means of brucine, diphenylamine, and indigo, and found the latter to be the most delicate. On adding 1 milligramme of absolute nitric acid to 1 kilogramme of sulphuric acid, and testing 100 Gm. of this in the manner directed above, upon addition of 100 Gm. of water the color was completely discharged after a few minutes.

The diphenylamine and brucine reactions are often used when examining drinking water for nitrates, but they give reliable results only when certain conditions are carefully observed.

A. Wagner (*Zeitsch. f. anal. Chem.*, 1881, 329) gives the following directions for the diphenylamine method: Put 1 C.c. of the solution suspected to contain nitrates, or, if sulphuric acid is to be tested for nitric, put 1 C.c. of pure distilled water into a small porcelain capsule, add a few crystals of diphenylamine, and then add, by means of a platinum spoon holding ½ C.c., two such spoonfuls in succession. The first spoonful causes the diphenylamine to melt, and the addition of the second causes it to be dissolved. If traces of nitric acid are present, a blue color will develop after a while, which soon changes to yellow. In the same manner, a red color is obtained with brucine. The author (Dr. Krauch) has, however, sometimes failed to obtain these reactions, though performing them exactly as prescribed. A deviation from the prescribed method will often lead to other results. A. Vogel, for instance,

*After: Krauch, Dr. C., "Die Prüfung der chemischen Reagentien auf Reinheit," 8vo, Darmstadt, 1888.

reports that he has never yet seen any "pure" sulphuric acid which did not give a rose-red tint with brucine. It seems next to impossible for the manufacturers of pure sulphuric acid to supply a product which will, under all circumstances, stand the brucine and diphenylamine reaction. On the other hand, it may well be demanded that it shall stand the indigo test.

Tests for reducing substances: To 60 C.c. of water add 15 C.c. of sulphuric acid, and one drop of a $\frac{1}{10}$ normal solution of permanganate of potassium (1 C.c. corresponding to 0.0056 Gm. of iron). A distinct red tint should be produced.

Metals. On diluting the acid [gradually] with 5 times its volume of alcohol [the acid to be dropped into the latter], no cloudiness should occur even on protracted standing (abs. of lead).

On diluting 10 C.c. of the acid with water, supersaturating with ammonia, the liquid should neither be rendered greenish by sulphide of ammonium, nor cloudy by oxalate of ammonium (abs. of other metals).

Test for Arsenic: Into a flask of the capacity of 200 C.c., fitted up for Marsh's test, are put 20 Gm. of zinc, absolutely free from arsenic, and then enough of the acid previously diluted with 3 parts of water. No arsenical mirror should be noticeable after half an hour's reaction.

The author adds that sulphuric acid free from arsenic is very commonly found in the market, but acid containing lead and substances oxidizable by permanganate is not of uncommon occurrence.

Test for Ammonia: Dilute 2 Gm. of the acid with about 30 C.c. of water, supersaturate with potassa (3 to 4 Gm.), and then add 10 to 12 drops of Nessler's solution. No distinct yellow or reddish-brown color should make its appearance.

The author states that the presence of 1 milligramme of ammonia in 100 Gm. of the acid, when the before-mentioned test is used, is shown by the development of a yellow color and turbidity.

Test for Halogens: Dilute 2 Gm. of the acid to 30 C.c., and add a few drops of nitrate of silver. No change should occur.

The author states that crude sulphuric acid [referring more particularly to the home product] usually contains arsenic, hydrofluoric acid, lead, iron, titanium, nitric oxide, nitrous and nitric acids, and selenium.

12. *Acidum Sulphuricum Fumans* ($H_2SO_4 + SO_3$). Fuming or Nordhausen Sulphuric Acid.

An oily liquid, sometimes slightly colored and not quite clear, fuming on exposure to air.

Test for Nitric Acid: To 20 Gm. of the acid are added 4 or 5 drops of diluted indigo solution (1 : 10), and the acid then added to 20 C.c. of water. The liquid must show a distinct blue tint even after some minutes' standing.

The author states that the methods quoted under No. 11—except the indigo method in the form here prescribed—are not applicable to this preparation. It seems that a fuming sulphuric acid standing the indigo test is rather rare. The commercial article usually discharges the indigo color quite rapidly. As the acid is used in mixture with pure sulphuric acid, in Kjeldahl's nitrogen assay, it is necessary to make a blank trial to ascertain the amount of nitrogen compounds present in the acid.

13. *Æther Purissimum.* Spec. grav. 0.722–0.720. Boiling point: 34–36° C. (93.2–96.8° F.).

It should be colorless, of a neutral reaction, and should not possess a disagreeable odor. On slowly evaporating 50 Gm. of ether, no residue should remain.

If 30 C.c. of ether are poured upon 5 Gm. of pure caustic potassa, and the mixture kept for a few days in a dark place, being occasionally agitated, no brown flakes should separate.

14. *Æther Purissimum. Anhydrous, distilled over Sodium* ($C_8H_{10}O$).

Spec. grav. 0.718–0.720. Boil. point: 34–36° C. (93.2–96.8° F.).

The reactions mentioned under the preceding apply also here. Water agitated with the ether should show neither an acid nor an alkaline reaction.

Absence of Water: Pour 15 C.c. of the ether into an absolutely dry test-tube, and then add a piece of metallic sodium of about the size of a pea. Not more than a very faint development of gas should occur, and the sodium must retain its metallic lustre even after six hours.

In ether which has not been distilled over metallic sodium, this test causes a fragment of sodium to be coated with a distinct yellowish-white coating of sodium hydroxide.

Note by the Author.—In the literature, the following tests have been proposed to test for the presence of water in ether: 1. Addition of an equal volume of bisulphide of carbon, which should produce no cloudiness (Beilstein). 2. Agitation with dry [completely dried? or air-dry? Dr. K.] tannin, which should remain pulverulent and not become liquid (Hager). 3. Addition of paper rendered blue by cobaltic chloride, which must not change its color (Napier).

The author also tried the addition of anhydrous copper sulphate, which becomes blue or green in presence of water.

The author found that ether having a spec. grav. of 0.725 did not stand any of these tests. "Æther purissimum" (No. 13) stood all but the sodium test. That which was distilled over sodium stood all the tests.

Both kinds of pure ether (Nos. 13 and 14) should be kept protected from the light.

15. *Alcohol Methylicum Purissimum* (CH_4O).

Spec. grav. 0.796. Boil. point: 64–66° C. (147.2–150.8° F.). Clear and colorless.

On evaporating 50 Gm., no residue should remain.

Test for Acetone: Mix 1 C.c. with about 10 C.c. of soda solution, of double normal strength; then add about 5 C.c. of double normal iodine solution. No cloudiness should occur (Kraemer's method).

On gradually mixing 2 C.c. of methylic alcohol with 2 C.c. of sulphuric acid, no yellow color should be developed.

(Note by the Author.) Methylic alcohol often contains acetone, acetate of methyl, methyl-acetal, aldehyde, propione, and allyl alcohol. Occasionally it is found so much contaminated with acetone that it will yield a considerable amount of iodoform with solutions of iodine and soda.

Ethyl alcohol is detected according to Riel and Ch. Bardy (*Compt. rend.*, 82, 768. *Berl. Berichte*, 1876, 638) as follows: Heat the wood spirit with sulphuric acid, add water, and distil. To the distillate add sulphuric acid and permanganate of potassium, afterwards hyposulphite of sodium, and finally a dilute solution of fuchsine. If ethyl alcohol was present, the liquid acquires a violet color.

16. *Ammonii Fluoridum Purissimum* ($NH_4Fl.$).

To be tested like Acidum Hydrofluoricum fumans (No. 5, page 44).

The author states that he has found in a specimen of this salt sold as "purissimum" nearly $\frac{1}{2}$ per cent of lead. On heating 10 Gm., a residue of 2 to 3 milligrammes is usually left behind, and is hardly avoidable. But lead should certainly be absent.

17. *Ammonii Molybdas Purissimus.* ($3(NH_4)_2O,7MoO_3 + 4H_2O$ or $Mo_7O_{24}(NH_4)_6$.)

Large, colorless crystals.

Test for Phosphoric Acid: On dissolving 10 Gm. of the salt in 25 C.c. of water and 15 C.c. of water of ammonia (sp. gr. 0.910), a clear solution should be produced. On mixing this with 150 Gm. of nitric acid of sp. grav. 1.200, the liquid, even after standing two hours in a moderately warm place, should not deposit a yellow precipitate.

This test is very delicate. One milligramme of absolute phosphoric acid was added to 100 Gm. of the salt, and when the latter was tested as above directed, a distinct yellow precipitate was produced. At the same time it is just as well to follow the directions usually given, viz.: that after an acid solution of molybdate of ammonium has been prepared for analytical purposes, it be put aside for several days at a temperature of 35° C., so that, *if* any phosphoric acid is present, it be surely deposited.

17. *Argenti Nitras Purus.*

Test for Nitrate of Potassium and Chloride of Silver: Dissolve 0.5 Gm. of the salt in 0.5 Gm. of water, add 20 C.c. of absolute alcohol, and shake a few minutes. The solution should be clear.

General Test for Impurities: Dissolve 2 Gm. in about 60 C.c. of water, warm the solution to 70° C., gradually precipitate the silver with the requisite quantity of hydrochloric acid, allow the precipitate to deposit, filter while warm, wash the precipitate, evaporate the filtrate to dryness and ignite it at a low red heat. Only traces of residue should remain.

Note. When exact results are wanted, a larger quantity should be taken in operation. Mr. H. Roessler, of Frankfurt-on-Main, informed the author that he used the following process: 100 Gm. of nitrate of silver are dissolved in distilled water, and the silver precipitated with hydrochloric acid. The filtrate is first concentrated in a porcelain capsule, then again diluted with some water, the liquid warmed and filtered and the filtrate evaporated to dryness. The residue finally remaining is gently ignited over a gas flame, and weighed. At the same time, a volume of distilled water, equal to that used in the preceding operation, is mixed with about 100 C.c. of purest nitric acid (sp. gr. 1.200) and 50 C.c. of hydrochloric acid (sp. gr. 1.190) in a porcelain capsule, the whole evaporated, gently ignited, and the residue weighed. The latter is deducted from the residue obtained from the silver salt.

Detection of Cochineal Color in Foods.

To detect cochineal color (or carmine) in foods, E. Lagorge directs to dissolve the substance in water or dilute alcohol, and if not already slightly acid, to acidify it with 1 or 2 drops of acetic acid, care being taken to avoid a decided excess of acid. The solution is then shaken with amyl alcohol, which extracts the coloring matter. The alcohol is poured off and evaporated with sufficient water on a water-bath. A few drops of a 3% uranium acetate solution are added to the water and a bluish-green color or precipitate shows the presence of cochineal. The addition of an acid gives the solution an orange color. To detect it in wine the latter is shaken with a mixture of equal volumes of amyl alcohol and benzene or, what is better, toluene, otherwise normal ingredients of the wine are dissolved and the action becomes indistinct. After shaking, the alcohol solution is poured off into a test tube and 2

C.c. of distilled water and 1 drop of uranium acetate solution are added and the contents of the tube thoroughly shaken. A bluish green color in the water shows presence of cochineal.

If ammoniacal cochineal has been added to the wine, the color of the lake passes from a violet red to a violet blue. Besides cochineal, some other substances give lakes with uranium oxide. Natural wine gives a yeast color, Campeachy extract gives violet, and Holland wine violet blue. The difficulty in removing the coloring matter from these wines renders the reaction with uranium acetate useless with them.—*Chem. Zeit.* and *J. Anal. Chem.*

On the Reactions, Solubility, etc., of Glass.

An important paper by Dr. F. Mylius, of the Imperial German Bureau of Physics and Technology,* published in the February number of the *Zeitschrift f. Instrumentenkunde*, contains some facts which are but little known or entirely new, and some of which help to account for phenomena often encountered by those who handle much glassware filled with liquid or solid products.

The object of the author's paper was rather an abstract one, namely, to discuss the methods best adapted to determine the technical value of glass.

Heretofore it has been customary to use, for this purpose, Rudolph Weber's process, which consists in exposing the glass in question, during twenty-four hours, to an atmosphere of hydrochloric acid vapors, and afterwards to the air. According to the quality of the glass, the latter will become coated with more or less of a film of chlorides produced by the acid vapor.

While this test is quite reliable when used by a practised eye, it is often uncertain in the hands of less experienced persons. For this reason a color-test, if feasible, would be highly desirable. And, in fact, such a one is subsequently described by the author. He first recalls the fact that certain color tests had been used before. Thus it is known that when *powdered* glass is added to a red solution of litmus, this will turn blue. In like manner will powdered glass exercise an alkaline reaction upon phenolphtalein and hæmatoxylin, imparting a purple color to a colorless solution of either of these reagents. The author has, however, discovered a new method, by "dyeing" the glass with a peculiar variety of eosine.

The method is based upon the fact that *glass is decomposed by water in ethereal solution.* It has been shown by Rieth, Weber, and the author that glass has the power of absorbing water from hydrated ether.

The hygroscopic tendency of glass is in direct proportion to its proneness to suffer decomposition. A piece of glass placed in hydrated ether absorbs the more water the poorer it is. The quantity of alkali which is thereby set free or capable of reaction may be used as a measure of decomposition, and may actually be measured colorimetrically *by converting it into a colored salt by means of eosine* (which is an acid). If the eosine is contained in the ethereal solution, a portion of it is deposited in the glass, and the quantity is equivalent to the amount of the alkali. The reaction may be represented by the following scheme:

I. $Na_2O(SiO_2)x$ + H_2O = 2NaHO + SiO_2.
Glass Water Soda (alkali) Silicic acid

II. 2NaHO + $C_{20}H_8I_4O_5$ = $C_{20}H_6Na_2I_4O_5$ + $2H_2O$.
Soda Eosine Eosine-soda salt Water

It has been found that the following method is most suitable in practice:

Saturate commercial ether at the ordinary temperature with water by agitation, remove the ethereal layer, and in 100 C.c. of it dissolve 0.1 Gm. of iodine-eosin. Filter the solution and preserve it in well-closed bottles [of hard glass]. It will keep for any length of time.†

When glass is to be examined colorimetrically, pieces of it are laid in the solution, or the latter is poured into tubes or vessels made from it.

Every kind of glass becomes coated, by protracted exposure to the air, with more or less of a layer of decomposition products, chiefly carbonates of alkalies. Before applying the test, this must be carefully removed by washing with water, alcohol, and ether.

When the test is performed, and the varieties of glass to be tested are available in shape of tubes, a series of these are cleaned as just described, then fused up at one end, and a quantity of the colored reagent poured into each. They are then hermetically sealed and set aside for twenty-four hours, when the liquid is removed and the tubes rinsed out with pure ether.

The eosine solution used has a bright orange-red tint, and the colored coats produced in glass-tubes of different quality vary from a pale purple orange, through pale purple, pink, and reddish, to perfect colorlessness, according to the quality of the glass.

The soft kind of glass, such as that containing lead (crystal glass), assumes the most deep purplish tint of all. The more difficultly fusible kinds, which are generally known as "hard glass" (Bohemian), become much less tinted. The most resistant of all Bohemian kinds of glass is that made by Kavalier, which is scarcely tinted at all. Good qualities of bottle glass as well as window glass are likewise scarcely affected by the eosine solution.

* Physikalisch-Technische Reichsanstalt (charged with the inspection and verification of standards of weight, measure, light, sound, heat, etc.).

† Ordinary eosine is a *bromated* substitution-product of fluorescein, and that which is soluble in water and used for red inks is usually the sodium salt of this body. This kind of eosine will not answer the above purpose. Bromated fluoresceine (not combined with a base) may be used, but the iodated compound is preferable, on account of the finer color. Iodine-eosine is to be had in the market, for instance, from C. A. F. Kahlbaum, of Berlin.

Testing the Purity of Creosote.

In view of the increased importance which creosote has recently acquired in medicine, W. Brandes, of Hanover, reviews some of the pharmacopœial and other tests which have been relied upon for recognizing its purity, and makes some suggestions for their improvement.

The German Pharmacopœia allows the specific gravity to vary between 1.030 and 1 080 (the U. S. Pharmacopœia, between 1.035 and 1.085). This appears to be too large a variation. The caustic soda test of the Germ. Pharm. (which is not used by the U. S. Pharm.) is thus modified by the author, after Hartmann and Hauers:

Mix 4 C.c. of water, 4 C.c. of solution of soda (15%), and 2 C.c. of creosote. The resulting liquid must be perfectly clear and of a light yellow color. Any turbidity would indicate the presence of indifferent oils, and a brown color would show that other constituents of coal-tar are present.

Creosote is mainly composed of guajacol and creosol.* Pure guajacol has the spec. grav. 1.117 at 15° C.; pure creosol, the spec. grav. 1.089 at 13° C. From this it follows that a *good* creosote should have a high spec. grav. Now, as the value of a creosote should depend upon the percentage of the above two bodies contained in it, and more particularly the former, a test should be applied which permits their estimation. This may be done by adopting the method of Hlasiwetz, depending upon the fact that both guajacol and creosol form potassium salts which are difficultly soluble in alcohol. To execute the test, prepare a solution of 50 Gm. of caustic potassa (purified by alcohol) in 200 Gm. of pure alcohol of 96% Tralles. Then agitate 10 C.c. of this solution with 1 C.c. of creosote. If the latter is rich in the two bodies mentioned, it will quickly solidify to a crystalline mass.

Mr. Brandes recommends the insistance upon a spec. grav. of at least 1.070 to 1.080, in order to insure the rejection of products containing but little of the important ingredients.

Regarding the collodion test of the pharmacopœia, the author says that care should be taken not to use collodion having an acid reaction, and to use a perfectly dry test-tube.

The glycerin test is very reliable, any phenol present being readily shown.

The author also mentions a test recommended by Hartmann and Hauers, which is as follows:

On shaking 2 C.c. of creosote, 4 C.c. of petroleum benzin, and 4 C.c. of a cold saturated solution of caustic baryta together, the benzin solution should not acquire a blue or muddy color, and the aqueous portion should not become red. Either coloration would show that other (objectionable) constituents of beechwood-tar are present.

When this test is applied to different samples of creosote, it will be found that the mixture finally separates, either in three layers: baryta solution, creosote, benzin; or in two layers: baryta solution, and solution of creosote in benzin. This different behavior is thus accounted for: Pure guajacol is insoluble in benzin, but pure creosol is soluble in this menstruum. When there is a certain proportion of both present, the creosol will aid the partial solution of guajacol. But when the latter materially predominates, or when the creosote contains phenol or cresol, the guajacol is not dissolved at all, and remains, mixed with the phenol or cresol, as a separate layer.

The author recommends to make the test with alcoholic potassa, which is mentioned above, officinal in about the following form:

On agitating 10 C.c. of alcoholic solution of potassa (prepared by dissolving 1 part of potassa purified by alcohol in 4 parts of pure alcohol of 96%), with 1 C.c. of creosote, the mixture should congeal, after a while, to a firm, crystalline mass, which should become, after half an hour's standing, so firm that it cannot be disturbed even by strong agitation.—After *Archiv d. Pharm.*

Poisoning by Citrate of Caffeine.—Mr. T. Geraty, M.R.C.S., of Nottingham, describes a case of poisoning by caffeine, the sufferer being a lady, who took a dessert-spoonful (equal to 200 grains) of pure citrate of caffeine in mistake for the granular effervescent form of the drug. A quarter of an hour after the reception of the poison there was semi-unconsciousness, grave depression, extreme pallor, all the muscles completely relaxed, and a decided inclination to sleep; pulse slow, soft, and very compressible; respiration slow and sighing. Emesis was induced by apomorphia and stimulants administered, but it was more than one hour before consciousness was recovered and the faintness passed away.—*Chem. and Drugg.*

* Guajacol is the methyl-ether of pyrocatechin—$OH.C_6H_4.OCH_3$. Creosol is the methyl-ether of homo-pyrocatechin—$OH.C_6H_3(CH_3).OCH_3$.

Creosol must not be confounded with cresol, which is a generic name for three isomeric bodies (difficult to separate) contained in coal-tar, and also in certain wood-tars, and which have the composition $OH.C_6H_4.CH_3$. Beechwood-tar contains both cresol and creosol.—Ed. Am. Dr.

Ointment for Burns.

Iodoformi	80 p.
Ext. Conii	40 p.
Acid. Carbolici	1 p.
Unguenti	600 p.

—*Med. Press.*

Injection Brou.

Opii,	
Catechu	ãã gr. viiss.
Croci	gr. xv.
Aquæ,	q. s. ad fl. ʒ ij. fl. ʒ ij.
Et adde	
Plumbi subacetatis	gr. xxiiss.
Zinci sulphatis	gr. xlv

—*Gallard.*

Almond Meal.—Blanched sweet almonds, ripe and dry beans, of each 18 oz.; orris root, 8 oz.; white Castile soap, 6 oz.; spermaceti, 1½ oz.; dried carbonate of sodium, 1 oz.; oils of bergamot, lavender, and lemon, of each 6 drachms. Beat or grind to a fine powder, and keep from the air. To be used with a little water, in place of soap, to clean, whiten, and soften the skin.—*Dr. Cir.* after Cooley.

Espey's Cream.—The following is said to produce a mixture resembling this preparation:—Quince seed, 1½ drachms; boracic acid, 4 grains; glycerin, 2 fl. oz.; alcohol, 3 fl. oz.; carbolic acid, 10 grains; cologne water, 2 fl. drachms; oil of lavender, 20 drops; glycerite of starch, 2 oz.; water, sufficient to make 1 pint. Dissolve the boracic acid in 8 fl. oz. of water, macerate the quince seed in this for three hours, and press through a cloth; add the glycerin, carbolic acid and glycerite of starch, and mix thoroughly; mix the cologne water and oil of lavender with the alcohol, and add to the mucilage, mixing the whole well.—*Dr. Cir.*

Bituminated Iodoform is a compound of iodoform and tar lately introduced as an antiseptic by Dr. Ehrmann, of Vienna. It is in the form of transparent, brown, metallic scales, easily pulverized, and is thought to diminish the volatility of the iodoform.

Camphorated Naphthol.—Crystallized carbolic acid is liquefied when mixed with an equal weight of camphor, and this property has been utilized in forming a liquid to be used as a painless cautery. Mr. Duquesnelle says that both alpha- and beta-naphthol possess similar properties, a mixture of ten parts of the latter with twenty parts of camphor producing a syrupy, colorless liquid, insoluble in water, but miscible in all proportions with fixed oils. To insure rapid solution, the substances must first be finely powdered.—*Pharm. Jour.*

Goose-grease is recommended by Percy Wells as a basis for ointments. It should be mixed with cocoa-butter, and in this form is very readily absorbed. Mr. Wells melts 3 pounds in an enamelled pan. When the small amount of membrane it contains forms a mass, it is to be strained through fine muslin and, while hot, ½ pound of cocoa-butter is added. The mixture is then to be stirred more and more vigorously as it cools, a wooden spoon being preferable to a knife or rod for this purpose. By being benzoated, it may be kept for a long time without change.—*Pharm. Journ.*

The Largest Scale in the world is said to be that which has recently been completed in Krupp's steel-works at Essen. Its load-capacity is 100,000 kilos (nearly 100 tons). The fee for its official verification and "sealing" amounted to 111 mark and 50 pfennige.

Fertilizer for House Plants.—It is reasonable to suppose that plants grown in the house may require the use of fertilizers quite as urgently as plants grown out of doors, if, indeed, the need is not more urgent, owing to the artificial life which they lead, and the deprivation of surroundings which nature furnishes. The cultivation of house plants is sufficiently common to warrant the attention of druggists to this want, and we give below a formula for a fertilizer which can be sold in packages to be added to the requisite proportion of water:

Carbonate of Potassium, Phosphate of Potassium, Carbonate of Magnesium, Silicate of Sodium, of each 1 part; Nitrate of Potassium, 2 parts; Sulphate of Iron, 3 parts. To be added to 2,000 parts of Water.

Treatment of Phthisis by Hot Air.—When Dr. Weigert published his results in the treatment of phthisis by inhalation of hot dry air, a good deal of scepticism was excited in the scientific world, and Weigert was not able to bring the details of his cases before the medical society to which he had intended to communicate them. Prof. Kohlshütter, of Halle, read a paper the other day before a medical society in which he confirmed the theoretical exactness of Weigert's announcement by stating that air heated to 350° F. could be inhaled by phthisical patients without any bad effects, while the influence of the inhalations on the tubercle bacillus seemed to be really destructive. The professor considers that the treatment is worthy of serious examination—a testimony which created no small sensation among his audience.—*Chem. and Drugg.*

A New Tænicide.—M. Thiel has examined the bark of a tree known as the "moussena," the *Acacia anthelmintica* of Baillon, growing principally in Abyssinia, and having a high reputation as a destroyer of tapeworm. It is said to be more active than kousso and to have a less disagreeable taste. The bark is the only part of the tree employed medicinally, and this is taken in the form of powder, in doses of from 1 oz. to 2 oz., alone or mixed with honey and stirred up in milk. The Abyssinians mix the powder with flour, and make bread with it, and take a sufficient quantity of the bread with butter or honey three hours before the first meal in the morning. The same evening or the next day the worm is generally expelled in fragments. M. Thiel has found in the bark a substance whose chemical characteristics resemble saponin, and he calls this "moussenine."—*J. de Med. de Par.* and *Chem. News.*

Morrhuol.—Morrhuol is being pushed forward. The process of manufacture consists, it seems, in extracting cod-liver oil with alcohol (90 per cent), and distilling the extract. The residue is a sharp-tasting, very bitter aromatic oil, which contains bromine, iodine, and phosphorus in some quantity, and which crystallizes at normal temperatures. The product is put up in capsules of 3 grains each, which are declared to correspond in therapeutical virtue to about 1½ drachms of cod-liver oil. Brown oil is said to yield from 4.5 to 6 per cent, pale oil 2.5 to 3 per cent, and white oil 1.5 to 2 per cent of morrhuol.—*Chem. and Drugg.*

Salol in Cholera.—Mr. Ernest Hart (editor of the *Brit. Med. Jour.*), on his recent visit to Paris, called at the private pathological laboratory of Professor Cornil, and among those working in the laboratory he found M. Lowenthal, of Lausanne, who was studying the action of salol on the comma microbe of cholera, and who insisted on the toxic influence of this substance on cultivations of the cholera bacillus previously revivified, and rendered very toxic by the action of pancreas, pancreatic juice, or pancreatin. When two tubes are taken, both containing a nutritive mixture to which pancreatic juice has been added, and also cholera bacillus cultivations, if to one be added a quantity of salol exceeding 10 centigrammes, the vegetation of the cholera *bouillon* was immediately arrested. According to the conclusions which he is disposed to draw from this research, salol may possibly become the preventive and curative agent of Asiatic cholera, but it must be tried in clinical practice before this conclusion can be definite.—*Chem. and Drugg.*

Use of Antipyrin or Antifebrin.—Many medical writers have reported the efficacy of both antipyrin and antifebrin in headache. The best method of administration, according to Dr. Carter and others, appears to be to give 5 grains (of either) every hour, until the pain begins to moderate. A relief is usually experienced after the first, but certainly after the second dose. It has, however, been noticed that the continued administration of antipyrin produces in some person a weakness of the heart's action, and for this reason Dr. Carter and some other authorities usually prefer antifebrin.

The Cod-Liver Oil Fisheries of Norway.—The continuous stormy weather during the whole fishing season of 1888 (between January and April) prevented the Lofoten fishing-boats from going out, and had it not been that fish ran into a small fjord named Ostnaesfjord, near Brettesnaer, it would have been one of the worst fishings for some years back. As soon as it was found that the fish had gone into this fjord, several thousands of boats flocked thither, with the result that in five weeks they took about 18,000,000 fish, bringing up the total number taken on the inner side of the Lofoten to 29,500,000, against 31,000,000 the previous year.

A Prize for Alkaloidal Assay-Methods.—The Belgian Academy of Medicine has, among other prize subjects of purely medical interests, proposed the following which concerns the pharmaceutical chemists: "To indicate from deductions based on personal and original investigations a precise and easy method for estimating alkaloids in medicaments and pharmaceutical preparations." The prize offered is 500f. Memoirs must be sent before December 15th, 1889, and bear no designation but a motto which is to be repeated on a sealed envelope containing the name of the writer. The essays may be written in either Latin, French, or Flemish. No work already published in whole or in part is to be admitted to the competition.—*Chem. and Drugg.*

Picrotoxin an Antidote to Morphine.—Messrs. Böhringer & Sons call attention to interesting preliminary experiments made by Professor Arpad Bokai which go far to show that picrotoxin, the active principle of *Cocculus indicus*, is probably the best antidote for morphine poisoning. Picrotoxin is said to prevent paralysis of the centre of respiration, by which death from morphine is caused. It has also exactly the opposite effect of morphine on the pressure of blood. Professor Bokai has promised further communications on this subject.—*Chem. and Drugg.*

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EDITORIAL.

IN an editorial contained in our last November number, page 216, we threw out a hint, or rather warning, to our European confrères, who are just awakening to the importance of *fluid extracts*, not to devise new methods or new apparatus for making these preparations, but to employ those which we, on this side of the Atlantic, have found, after nearly forty years' trial, to be most suitable. If our confrères, after such trial, could evolve anything better, we should be only too glad to adopt it. But we were then, and are now even more, convinced that the disregard of our hard-gained and minutely recorded experience, accessible in our literature, would eventually entail much disappointment upon our Continental brother-pharmacists.

We have recently seen an illustration and description of a new percolating apparatus designed by the well-known firm of Schlag & Berend, of Berlin, which bids fair to make the user obtain but a poor opinion of the value of fluid extracts. It consists of a glass percolator, containing a glass diaphragm (fused in) and a glass stop-cock. It is connected by means of glass and rubber tubing with the receiver, which is a Woulff's bottle having a tubulure at the bottom. Cumbrous and complicated as this apparatus is, it might yet be made serviceable by proper management. But the accompanying directions utterly destroy its utility. Among these directions are the following:

"When the apparatus is to be used, put the drug in coarse [!] powder into the percolator, and dampen it with the menstruum, the stop-cock being closed. Connect the other parts of the apparatus, and having caused enough of the menstruum to flow on top, allow to macerate for three days. Now open the glass faucet of the percolator, and allow the percolate to flow off, with suitable regulation of pressure [by means of a reservoir, which we need not describe here]. It is of advantage either to pour back the first percolate so as to pass it through the drug again [!], or at once to evaporate it. When the percolate amounts to four-fifths of the weight of the drug, the operation is continued with fresh menstruum until the drug is exhausted," etc.

It would be difficult to devise a process more thoroughly faulty, or more surely resulting in failure, than this. It seems our confrères are bound to run the gauntlet of experimentation themselves, without benefiting by the experience previously gained by others. Well, we can only look on and wait, remembering that a wilful man must have his way.

ATTENTION is called to the fact that the "Digest of Criticisms on the United States Pharmacopœia, Sixth Decennial Revision (1880)," part I., which has been published by the Committee of Revision, is now off the press and ready for distribution to those who are entitled to receive it under the resolution of the Committee. As the pamphlet is *not for sale*, and has been printed at the expense of the Committee for the purpose of assisting those who are actually engaged in work preparatory to the next revision, or who are members of Pharmacopœia Committees, it will be well to quote the following Notice from the pamphlet, as there are already indications that some persons desire the publication merely as a literary curiosity, to be put on their shelves perhaps among "privately printed books," without really intending to make use of it. The number of legitimate applicants is likely to be large enough to exhaust the edition in a short time. Care will therefore be taken not to bestow copies where it will be almost certain that they will be of no use to the revisers of the pharmacopœia.

The Notice above referred to is as follows:

1. An official copy of this Digest will be sent to all incorporated Medical and Pharmaceutical State Associations, Societies and Colleges, and to similar institutions and bodies, as far as their existence or location is known.
2. Additional copies may be obtained by any of these bodies, for the use of any Committee on Pharmacopœia, by forwarding the amount of postage, which is 8 cents per copy.* Not more than *five* copies can be thus obtained at first; but if the number remaining in stock permits, more may afterwards be supplied.
3. Each member of the Committee of Revision will receive five copies.
4. Copies may be sent, free of postage, to such individuals as are known to be engaged in pharmacopœial work, and whose names are furnished to the Chairman.
5. Copies sent to individuals at their own request, will *not* be sent carriage-free. The amount of postage (8 cents) must accompany the request.
6. Every recipient of this pamphlet is requested to send to the Chairman of the Committee the titles of any publications which may be known to him to contain valuable and *positive* contributions to the next revision of the U. S. Ph., and which have not been already abstracted for Part I.

*This was the estimated postage before the pamphlet was bound. The actual postage was 7 cents.

It may be stated here that while the resolution under § 1 distinctly specifies "incorporated bodies," in deference to the fact that only the latter are (with special additions) represented in the decennial pharmacopœial convention, yet copies of the pamphlet will be also placed at the disposal of non-incorporated bodies, if actively engaged in pharmacopœial work, so far as the copies on hand will permit.

Part II. is nearly ready for the press, but will be held back for about one month, in order that correspondents may indicate the titles of journals or works not yet made use of. It should be understood that no blame should attach to the Committee for having failed to use any source of information which has not been pointed out to them as deserving of notice.

WE are much pleased with the sensible course adopted by the Commission of Pharmacy for the State of Maine, as illustrated by the circular letter which we print elsewhere in this number. Such a frank and reasonable effort to aid candidates for a license to practise pharmacy should find many imitators among other State boards. It is likely to impress every prospective applicant with the belief that while the board intends to enforce the law regulating the practice, it is fairly disposed towards all who are possessed of the essential matters of information which are requisite, and that no one who will take the trouble to inform himself of things which every pharmacist should know needs to fear the ordeal to which he will be subjected.

EXHIBITORS at the American Pharmaceutical Association in San Francisco on the 24th of June next are requested to communicate without delay with Prof. E.W. Runyon, the local secretary, at 53 Stevenson street, San Francisco, Cal. As this is to be the first meeting of the association on the Pacific coast, a special effort is being made to render it very attractive, and to include in the exhibition whatever is of interest to druggists.

Correction.

IN the paper by Edo Claassen, on "Improvement in Filter Papers," quoted in our last number, page 51, from the *American Journal of Pharmacy*, the word *centimeters*, in the text and the illustrations, had better be read *millimeters*, according to a note by the author in the succeeding number of the A. J. A. [Of course, it makes no difference, which of the two denominations of measure is chosen. Looking at the size of the illustrations, millimeter might perhaps be more appropriate.] Mr. Claassen also states that it will be advantageous in many cases to again fold the narrow strip (indicated in the figures by dotted lines) by bringing its lower end, commencing at the angle, over to the inner crease, thus forming a small triangle ; and in case the neck of the funnel should be unnecessarily large, he recommends to support the filter in a cone of writing paper, folded like a plain filter, but having the point cut off sufficiently to permit the lower end of the filter to project beyond the aperture.

College of Pharmacy of the City of New York.—The annual election of officers was held on Thursday, March 21st, at the College building, 209–211 East 23d street. The following were elected:

President: Ewen McIntyre.

Vice-Presidents: H. J. Menninger, George C. Close, W. L. Vennard.

Treasurer: David Hays.

Secretary: J. N. Hegeman.

Trustees, to serve for three years: B. F. McIntyre, S. J. Bendiner, Emlen Painter, Chas. F. Schleussner.

The examination of the two classes takes place from April 1st to 5th, and the Commencement will be held on Tuesday, April 16th, 7:30 P.M., at Steinway Hall.

Attention is called to the fact that the Summer Course in Practical Botany, combined with botanizing excursion, under Prof. Schrenk, begins on April 10th.

American Medical Association.—This association meets on the 25th to 28th of June, inclusive, in Newport, R. I., and H. R. Storer, M.D., Chairman of the Committee of Arrangements, invites applications for spaces in the exhibition. As the room to be devoted to an exhibit is somewhat limited, an early application is rather essential, and the applicant should state the nature of the proposed exhibit. Address Dr. Charles A. Brackett, Newport, R. I.

Botany in the College of Pharmacy.—The lectures to the summer class in *Practical Botany* at the College of Pharmacy of the City of New York will commence on Wednesday, April 10th, at 4.30 P.M., and will be continued every Wednesday until the end of June. This course, in which botanical excursions are included, is open to all (ladies as well as gentlemen) who desire to be instructed in the science of botany. The attention of prospective pharmaceutical students is particularly directed to this opportunity to become initiated into an important branch of their curriculum. The course in microscopic botany will begin on Thursday, April 11th, at 7.30 P.M. Thorough individual instruction will be given to a limited number of ladies and gentlemen in all the more important microscopical manipulations. Particulars may be obtained by applying to the clerk of the college, 209–211 E. 23d St., or to Prof. Jos. Schrenk, at Hoboken, N. J.

Louisiana Board of Pharmacy.—A letter from Mr. R. N. Girling, of New Orleans informs us that at the last meeting of the State Board of Pharmacy, 573 applications had been received for registration under the law approved by the Governor on the 11th of July, 1888. The board consists of A. N. Girling (chairman), A. K. Finlay, and R. L. Iler. Mr. F. C. Godbold, cor. Magazine and Thalia sts., is the secretary, and written examinations are held on Pharmaceutical Chemistry, Materia Medica, Toxicology, Practical Pharmacy, Adulteration of Drugs, Reading and Compounding Prescriptions, Doses, and such other subjects as may be deemed expedient by the committee.

Philadelphia College of Pharmacy.—186 pupils received the degree of Graduate in Pharmacy on the 19th of March (68th Annual Commencement); one of the number was a woman, named Emma Bour Nardyz. The following prizes were awarded : Certificate of proficiency in Chemistry, to H. J. M. Schroeder, Ph.G. The PROCTOR PRIZE of a gold medal and certificate for highest grade of scholarship and meritorious theses, to F. B. Quackenbush, Messrs. H. V. Arny, G. A. Krauss, E. S. Reeder, J. H. Small, C. M. Southall, and J. L. Weil were distinguished, and J. Calvin, G. A. Dietz, Jr., H. R. Gillespie, R. A. Hotchis, H. V. Haak, I. F. Kilgus, H. Kraemer, and G. H. Ray were meritorious. The H. C. LEA PRIZE of $100, for the best thesis was won by H. Kraemer. The MATERIA MEDICA PRIZE (a Zentmayer microscope) for original histological work on American plants, went to H. Kraemer, with honorable mention of H. V. Arny and G. H. Ray. The PHARMACY PRIZE (gold medal) for original pharmaceutical work, to F. B. Quackenbush, with honorable mention of C. D. Kingston and S. E. Howell. The CHEMICAL PRIZE (chemical balance) to G. A. Krauss, for original quantitation analysis, with honorable mention of G. A. Deitz, Jr., F. V. Cassaday and J. L. Weill. The ANALYTICAL CHEMICAL PRIZE ($25) for original work, to F. B. Quackenbush. The JAMES S. ROBINSON PRIZE gold medal and certicate) chemistry and analytical chemistry, C. M. Somthall. The JOHN M. MAISCH PRIZE ($20) for histological knowledge of drugs to Augustus Bradley, with honorable mention to a number of competitors. The OPERATIVE PHARMACY PRIZE to W. B. Crawford, Jr. The THEORETICAL PHARMACY PRIZE, to E. S. Reider.

Ohio Pharmaceutical Association.—The eleventh annual meeting will be at Mansfield, Ohio, June 4th, 5th and 6th. Ample arrangements have been made for the exhibition in a hall 67x77 feet, which also serves as the ante-room to the meeting hall. E. H. Lindsey is the Local Secretary (to whom all inquiries relative to the facilities for exhibiting goods should be addressed), and W. M. Barton, Dr. A. H. McCullough, and F. B. Grove are the Committee on Exhibit.

Cincinnati College of Pharmacy.—The annual commencement was held on the 14th of March, in the Musik Verein Hall and the following-named gentleman were made alumni: A. Bauer, R. S. Burnett, L. C. F. Cramer, C. Fleischmann, C. Fredricks, Jr., W. F. Fuldner, H. H. Groathaus, H. Herr, A. A. Krieg, M. Metzger, G. J. Mitchell, J. W. Morford, V. C. Muehlberg, H. Nippert, A. F. Schmidt, W. V. Skillman, H. W. Stegemiller, L. C. Widrig. A ball followed the graduating exercises, when the company danced to such music as Castor-oil Lanciers, Creosote Polka, Flaxseed Quadrille, Rochelle Schottische, Paregoric Waltz, etc.

American Pharmaceutical Association.—E. W. Runyon, the Local Secretary of the Association, invites correspondence relation to the exhibition which will be coincident with the meeting. His address is 53 Stevenson street, San Francisco, Cal.

Pennsylvania Pharmaceutical Association.—The next meeting will be held in Scranton, June 4th, instead of June 11th, as announced. This is to enable those who desire to do so to attend the meeting of this association as well as that of the Amer. Pharm. Assoc. in San Francisco.

The Croatian Pharmacopœia.—The first edition of an Croatian Pharmacopœia was published on the first of January, and corresponds very closely to the Hungarian Pharmacopœia.

A NEW edition of the Pharmacopœia Neerlandica will soon appear, the manuscript having been completed and placed in the hands of the Minister of the Interior.—*Pharm. Jour.*

Season Tickets for the Paris "Exhibition."—An official notice just published sets forth that season tickets will be issued at 100f. to the public, and 26f. to members of committees. Applicants are to give two of their photographs, card size, one of which will be returned with the receipt on the back, and will form the admission ticket. Foreigners may send the money to the Minister of Finance, "*Caisse centrale du Trésor*," by post-office order, in a registered letter, together with two of their photos, and 10 cts. extra for revenue stamp and return postage. They will receive by mail a receipt, against which, on coming to Paris, they will be handed their admission ticket. Members of committees must add official documents establishing their position.—*Chem. and Drugg.*

CORRESPONDENCE.

Pharmaceutical Excursion to the Paris Exposition.

SEVERAL pharmacists of my acquaintance, in conversation or by letter, having expressed regrets that the California excursion of the A. P. A. had been arranged at a season of the year inconvenient for them to leave, it has been suggested that an effort be made to arrange a party to visit the Paris Exposition leaving about July 20th, to be gone from thirty to thirty-five days, allowing from two to three weeks in Europe. Inquiries have elicited the fact that a party not to exceed forty can do this, allowing seven to ten days in Paris and three to five in London, for a sum not exceeding $200, by taking second cabin on the French line of steamers, which are unexcelled in every respect by i he

transatlantic fleet. Friends who have travelled second cabin by this line say that in the way of comforts as regards state-rooms and table, to a company travelling together, it is all that could be desired. The first cabin would cost about $75 additional. Rooms and guides could be secured in advance. For about $25 additional, a trip down the Rhine could be arranged. Those desiring to extend their stay could do so. In order to secure accommodations, it would be necessary to have names booked not later than June 15th. Further information furnished on application. J. W. COLCORD.

BOSTON, March 18th, 1889.

Seventh Decennial Convention for Revising the Pharmacopœia of the United States of America.

NOTICE is hereby given that, in accordance with and by virtue of the authority vested in me by the Convention of 1880, I hereby call upon the several incorporated Medical Societies, incorporated Medical Colleges, incorporated Colleges of Pharmacy, and incorporated Pharmaceutical Societies throughout the United States of America, The American Medical Association, and The American Pharmaceutical Association, to elect a number of delegates, not exceeding *three*, and upon the Surgeon-General of the Army, Surgeon-General of the Navy, and the Surgeon-General of the Marine Hospital Service to appoint, each, not exceeding *three* medical officers to attend a General Convention for the Revision and Publication of the Pharmacopœia of the United States of America, to assemble in the city of Washington, D. C., on the first Wednesday of May, 1890 (May 7th), at twelve o'clock noon.

The several bodies, as well as the Medical Departments of the Army, Navy and Marine Hospital Service, are hereby requested to submit the Pharmacopœia to a careful revision, and to transmit the result of their labors to the Committee of Revision at least three months before the meeting of the General Convention.

The several Medical and Pharmaceutical bodies are hereby requested to transmit to me, as the President of the Convention of 1880, the names and residences of their respective delegates, as soon as they shall have been appointed; a list of these delegates shall thereupon be published under my authority, for the information of the medical public, in the newspapers and medical journals in the month of March, 1890.

In the event of the death, resignation or inability of the President of the Convention of 1880 to act, these duties (in accordance with the Resolution of that Convention) shall devolve, successively, in the following order of precedence, upon the Vice-Presidents, the Secretary, the Asst. Secretary, and the Chairman of the Committee of Revision and Publication of the Pharmacopœia.

These officers are as follows: *First Vice-President*, Samuel C. Busey, M.D., of Washington, D. C.; *Second Vice-President*, P. W. Bedford, Ph.G., of New York; *Secretary*, Frederick A. Castle, M.D., of New York; *Assistant Secretary*, C. H. A. Kleinschmidt, M.D., of Washington, D. C.; *Chairman of Committee of Revision*, Charles Rice, Ph.D., of New York; *First Vice-Chairman of the Committee of Revision*, Joseph P. Remington, Ph.M., of Philadelphia, Pa.; *Second Vice-Chairman of the Committee of Revision*, C. Lewis Diehl, Ph.G., of Louisville, Ky.

At the General Convention held in Washington, D. C., on the fifth day of May, 1880, the organizations and bodies enumerated in the Abstract of the Proceedings of the National Convention of 1880, on pp. xv. to xviii. of the U. S. Pharmacopœia of 1882—a list of which will be found appended to this call—were recognized as being entitled to representation.

If any body other than those admitted in 1880 shall desire a representation in the Convention of 1890, it is suggested that the proof of incorporation, signed by the Secretary of State of the State which shall have issued the charter, or by properly qualified public officials of the United States, be presented with the credentials of the delegation.

A blank form of certificate of appointment of delegates will be sent upon application by letter to my address, care of Dr. Edwin H. Brigham, Assistant Librarian of the Boston Medical Library, 19 Boylston Place, Boston, Mass.

ROBERT AMORY,
President of the Convention of 1880.

BOSTON, March 9th, 1889.

List of Incorporated Bodies and of Government Departments represented in the Pharmacopœial Convention of 1880.

Connecticut Medical Society; Iowa State Medical Society; Massachusetts Medical Society; Medical Society of the State of New York; Medical Society of the State of North Carolina.

College of Physicians and Surgeons in the City of New York; College of Physicians, Philadelphia; Medical and Chirurgical Faculty of Maryland; Medical Society of the District of Columbia; New York Academy of Medicine; Philadelphia County Medical Society.

Albany Medical College, Med. Dept. of Union University, Albany, N. Y.; Bellevue Hospital Medical College, New York; College of Medicine, Syracuse University, Syracuse, N. Y.; College of Physicians and Surgeons, Med. Dept. of Columbia College, New York; Dartmouth Medical College, Hanover, N. H.; Department of Medicine and Surgery of the University of Michigan, Ann Arbor; Jefferson Medical College, Philadelphia, Pa.; Medical College of Indiana, Med. Dept. of Butler University, Irvington, Ind.; Medical Department of Howard University, Washington, D. C.; Medical Department of Iowa State University, Iowa City; Medical Department of the University of Georgetown, Washington, D. C.; Medical Department of the University of Maryland, Baltimore; Medical Department of the University of Pennsylvania, Philadelphia, Pa.; Medical Department of the University of Virginia, Charlotteville, Va.; Miami Medical College, Cincinnati, O.; Missouri Medical College, St. Louis; National Medical College, Med. Dept. of Columbian University, Washington, D. C.; Rush Medical College, Chicago, Ill.; University of the City of New York, Med. Dept., New York; Woman's Medical College of the New York Infirmary, New York; Women's Medical College of Pennsylvania, Philadelphia, Pa.

Chicago College of Pharmacy, Chicago, Ill.; Cincinnati College of Pharmacy, Cincinnati, Ohio; College of Pharmacy of the City of New York, N. Y.; Louisville College of Pharmacy, Louisville, Ky.; Maryland College of Pharmacy, Baltimore, Md.; Massachusetts College of Pharmacy, Boston, Mass.; National College of Pharmacy, Washington, D. C.; Pennsylvania College of Pharmacy, Philadelphia, Pa.; Philadelphia College of Pharmacy, Philadelphia, Pa.; St. Louis College of Pharmacy, St. Louis, Mo.; University of Michigan, School of Pharmacy, Ann Arbor, Mich.

Medical Department of the U. S. Army; Medical Department of the U. S. Navy; U. S. Marine Hospital Service.

Examinations by the Maine Board of Pharmacy.

To the Pharmacists of Maine:

APPEALS have often been made to the Commissioners of Pharmacy for copies of the questions to be asked at an examination, or at least for some indication as to the direction and range of the questions. The first of these requests cannot, for obvious reasons, be complied with. As to the second, when we consider the portentous volume of the text-books, the overwhelming multitude of details contained in them, the hopelessness of memorizing more than a minute fraction of their contents, and the aimless and discouraging wandering of a student in search of probable subjects for examination, the wish expressed seems only reasonable. Impressed with this conviction, the Commissioners have decided on giving some suggestions for a course of reading as a preparation for the questions which may be contained in the question paper next to be formulated. In order to afford time for the prescribed course of reading, the question paper prepared in August, 1888, will be employed in examinations for the most part, and perhaps all of the current year, and the new Question Paper will be prepared in season for the February examination of 1890. But the course of reading prescribed will be of advantage in aiding to answer the questions now in use.

In Materia Medica, then, we shall ask some questions about the remedies which have been made officinal within the last ten years. *Examples:* Acid Boric, Acid Hydrobromic, Acid Oleic, Acid Salicylic, Auri et Sodii Chloridum, Caffeina, Camphora Monobromata, Chrysarobinum, Erythroxylon, Eucalyptus, Glycyrrhizinum Ammoniatum, Guarana, Lithium, Physostigma, Pilocarpine, Thymol, Viburnum. A more complete catalogue will be found in the Pharmacopœia of 1880 (6th revision), in the List of Articles added.

In Chemistry the student is recommended carefully to read the first fifty-eight or sixty pages of Attfield, paying particular attention to the two or three pages of definitions; then read the chemistry of the Basylous Radicals or Metals, giving due heed to the symbols and formulas, so that he can correctly compute the number of atoms in any given formula, and from their atomic weight can compute the molecular weight of a compound, or the percentage of each constituent. The student may also be required to tell us how much of any given element is present in an ounce or a gramme of any compound. Study also with care the analytical tables on pages 123, 161, 218, 219, 254, 255, not forgetting the notes on the tables, which sometimes go before them and sometimes follow them. (The pages quoted are of the 10th edition; in other editions they may differ more or less.) After the June examination of the present year, the plea that the applicant has never studied Chemistry will not be accepted as a valid excuse for failure to answer, in part at least, the Chemical Questions.

In Pharmacy, Remington or Parrish generally, with special attention to Chapter I. (Remington) on Metrology. We believe that the Metric System and Parts by Weight *have come to stay*, and shall accordingly formulate some questions bearing on that system of Weights and Measures, and also upon the relations between weight and volume, especially of liquids. Study also Chapter LXV. on Incompatibilities. Some of the questions we shall ask in Extemporaneous Pharmacy will belong to one or the other

of the two previous departments. We don't propose to burden the student with memorizing long lists of specific gravities or atomic weights; sufficient data will be given with every question involving such quantities for computation. We would like to know whether the applicant knows anything about the articles he is working with when he is compounding a prescription.

We shall be happy to aid any student entering upon the above course of study and encountering any difficulty with advice or explanation to the best of our ability, if he writes to us, inclosing stamp for return postage, and stating his trouble.

We issue this circular by way of experiment. We are conscious that much which ought to be included is left out; yet it comprises very much more than can be contained in any question paper for examinations as we are compelled to conduct them under present conditions. We hope, however, for some good results from this first attempt, which has been made in the interest of those who have never enjoyed the advantages of a College of Pharmacy.

BY ORDER OF THE COMMISSIONERS OF PHARMACY.

PORTLAND, February, 1889.

QUERIES & ANSWERS.

Queries for which answers are desired, must be received by the 5th of the month, and must in every case be accompanied by the name and address of the writer, for the information of the editor, but not for publication.

No. 2,298.—**The Estimation of Urea** (D. E. and P. A. R.).

As the reply to this query is somewhat lengthy, we have placed it in another part of this number. See page 63.

No. 2,299.—**Listerine** (B. J. D.).

This is a proprietary antiseptic, which is said to have the following composition (about):

Benzoic Acid	120 grains.
Borax	120 "
Boric Acid	240 "
Thymol	40 "
Eucalyptol	10 drops.
Oil Peppermint	6 "
Oil Thyme	2 "
Alcohol	8 fl. oz.
Water	enough to make 32 " "

No. 2,300.—**Toddy** (P.).

This word, designates an intoxicating beverage prepared originally in India, and at present in many other tropical countries, from the juice obtained by wounding the spathes or stems of certain palms, or from the fruit stalks.

The name *toddy* is a vernacular modification (*tâdi*, or *tâdi*, written with a cerebral *d*) of the old Sanskrit word *tâla*, which denotes the wine palm, *Borassus flabelliformis*, and is of very common occurrence, even in old Sanskrit literature. From this is derived *tâli*, which denotes the wine made from the palm, and this word, in passing into the vernaculars, became modified to *tâdi*.

The word *toddy* has, of course, no relation whatever to the family name Todd, as might be inferred from the fact that several authorities (such as the French Pharmacopœia) quote a "Potio Todd," which happens to be a spiced kind of brandy, and appears to have originated with some person of the name of Todd, though we have not searched the literature to make sure of this point. Our object here was to put on record the correct etymology of the word *toddy*.

No. 2,301.—**Champagne-Cider** (H.).

One of our confrères in the country writes that he has a large lot of apple cider barrelled up in his cellar since last fall. He would like to turn it into "champagne-cider," and asks us to send him a formula.

We do so with the reservation that we give the formula on the authority of others, who speak well of it. We have never had occasion to try it. It would be well to experiment on a small scale first, as there will be less risk of spoiling the remainder:

Good pale Cider	100 gallons
Alcohol	3 "
Sugar (or Honey)	24 pounds

Mix them. In the case of the sugar, dissolve this in a part of the cider, and add this to the remainder. Let the mixture stand during two weeks in a moderately cool place, but watch it carefully, as it should not ferment before it is bottled. Finally take out a few gallons, mix them intimately with ½ gallon of skimmed milk, and incorporate the mixture thoroughly with the contents of the cask, which will thereby be clarified. Lastly, bottle the clear liquid, and secure the corks. Keep the bottles in a moderately cool place on their sides, or standing up-side down.

No. 2,302.—**Hensel's Tonicum** (Wheeling).

"Can you furnish me with a working formula for a preparation called 'Hensel's Tonicum,' or, at least, can you untangle its ponderous chemical formula, which is given as:

"$Fe_2'''(C_9H_{13}O_{13})\ Fe''(C_6H_8O_8)$? A recent advertisement of the preparation contains vague allusions to formic acid, which I have failed to associate with the above formula."

We know nothing of the preparation in question. Regarding "formic acid," the chemical formula of which is CH_2O_2, there is no possibility of making this agree with any part of the above formula. Taking the first part, the Fe_2''' would indicate that these two atoms of triad iron replace 6 atoms of hydrogen in an acid, the original formula of which must have been $C_9H_{18}O_{12}$. Now we have made some attempt to find such an acid in chemical literature, but have so far failed. There *may* be a chemical individual corresponding to the above, and we shall be glad if any of our readers can solve the riddle.

The second part of the formula is plainer. The dyad iron indicates that the formula of the acid was originally $C_6H_{10}O_8$. This is the formula for saccharic acid, which in most compounds is bibasic: $C_6H_8BaO_8$ barium saccharate.

Whether the designers of the formula had in view an acid $C_3H_6O_4$, or whether there is an error in the figures, we cannot say.

No. 2,303.—**Impregnating Casks, Wooden Vessels, etc., with Paraffin.**

Wooden vessels may be rendered impervious to ordinary liquids by careful impregnation with paraffin. Of course, it is presumed that the joints of staves, heads, etc., are as tight and close-fitting as it is practicable to make them.

Supposing a wooden tub is to be paraffined. It must first be thoroughly dried in a warm place. If possible, several weeks should be consumed by this drying process. Then 1 part of paraffin is melted, under constant stirring, over a moderate fire; when all is melted the heat is withdrawn, and the mass stirred until it begins to stiffen on the surface. It is then carefully mixed with 6 parts of petroleum ether, or bisulphide of carbon, and the solution freely applied to the tub by means of a brush, as long as the wood absorbs any of it. If the tub is to be used only for cold liquids, it is only necessary to allow the volatile menstruum to evaporate, when it will be ready for use.

When the vessel is to be used for hot liquids, the inner and outer surfaces of the tub are finally coated (according to E. Schaal, *Dingl. Pol. Journ.* 271, 237) with a dilute solution of sodium silicate, allowed to dry and then washed off with dilute hydrochloric acid. The silica thus set free closes the external pores and prevents the paraffin from oozing out.

No. 2,304.—**Preventing Change in Sublimate Dressings** (S. W. M.).

If chloride of ammonium is combined with corrosive sublimate in the proportion of about half a part of the former to each 1 part of the latter, the tendency of the corrosive sublimate to undergo reduction to calomel and metallic mercury upon the fabric is greatly diminished.

Another method, said to be still more effective, is that which was proposed some time ago by Laplace. It consists in adding tartaric acid to the solution:

Bichloride of Mercury	5 parts
Tartaric Acid	20 "
Distilled Water	1,000 "

in which the quantity of bichloride may, of course, be reduced to any desired lower strength. The author directs to soak the fabrics in this solution during 2 hours, then to wring them out and to dry them.

It is, however, a pertinent question whether the efficacy of corrosive sublimate dressings is not dependent upon the fact that the salt *does* undergo decomposition, and by the liberation of nascent chlorine accomplish the effects aimed at. This being the case, it is evident that any method which retards in any considerable degree this change in the bichloride will in just so far render the application of the dressing useless.

No. 2,305.—**Jujube Paste** (Colorado).

This is prepared by infusing 5 parts of jujubes (see below) with enough water to make 35 parts of clear infusion, then dissolving in this 30 parts of gum-arabic and 20 parts of sugar, evaporating, adding 2 parts of orange-flower water, keeping at a slow and gentle boil for twelve hours, and then pouring into moulds.

The *Zizyphus Jujuba* Lam. or jujube tree is found all through southern and eastern Asia, though in some parts other species of Zizyphus predominate. Its wood is tough and strong, and used for many technical purposes. The fruit of the wild kind is dried, powdered, and used in this form in some countries. In others, the tree is carefully cultivated, grafting being commonly resorted to, as this produces a large and milder tasting fruit. The bark is used in the Moluccas in diarrhœa (being a plain astringent), and the root, combined with some aromatics, in fever. Besides the species already mentioned, the Zizyphus vulgaris, native of Syria, furnishes the largest supply of the European jujube paste manufacturers.

In India (Bombay), the market is usually supplied from China and the Persian Gulf ports (Dymock). The Chinese dried fruit is there preferred, as it is larger and sweeter. It is 1 to 1½ inches long, and ¾ inch broad; skin red, much shrivelled; pulp adherent to the stone, spongy, sweet, and yellow; stone $\frac{1}{10}$ of an inch long, very hard and rugose, apex sharp-pointed, shell very thick, seed oblong, flat, of a chestnut color, $\frac{4}{10}$ of an inch long, and $\frac{2}{10}$ broad. The fruit from the Persian Gulf is somewhat smaller.

No. 2,306.—**Florida Water** (D. S. W.).

There are various formulas scattered through the literature for making a "Florida Water," but we cannot guarantee that they will produce a product equal to that made by large manufacturers, who have more facilities and better selected ingredients than the maker on a small scale. Florida Water has an immense sale all through the West Indies, Central and South America, the chief supply being from a well-known New York house.

We append a formula for Florida Water, given by Cristiani:

Oil of Bergamot	8	oz.
" " Orange	4	"
" " Lavender (best)	3	"
" " Cloves	1½	"
" " Cinnamon (Ceylon)	¼	"
Tincture of Orris	8	"
" " Bals. Peru	4	"
Alcohol, deodorized	4	gall.
Water	6	pints

Dissolve the oils in the alcohol, then add the water. Allow the mixture to stand for some days before filtering and bottling.

Cristiani gives the quantity of oil of cinnamon as ¼ pint. But this must be a misprint, as the odor of this quantity of oil of cinnamon would overcome that of the other oils.

Tincture of orris is directed to be made from 2 lbs. of orris root, and a mixture of 7 pints of alcohol and 1 of water.

Tincture of balsam of Peru is made by dissolving 1 lb. of the balsam in 1 gallon of alcohol.

No. 2,307.—**Alcoholic Yeast** (M. B.).

This correspondent wants a formula for making yeast. In referring to one which he says he has tried and found a failure, he probably errs when he quotes our journal, as we do not remember having published such a formula in the regular text.

We will, however, take from our files the following, which is well spoken of.

Mix common wheat flour with water to a thick paste, cover it loosely, and keep it for some time in a moderately warm place. After 3 or 4 days it will begin to exhale a disagreeable odor, which will, however, after a few more days give way to a distinctly vinous odor. At the same time gas will be evolved from the mass. In this condition it is fit to excite the vinous fermentation. Now make a wort by pouring upon 10 parts of coarsely ground malted barley 100 parts of almost boiling water. Add 1 oz. of hops for every 2 gallons of the latter. Cover well during one hour. Then strain through a fine sieve or a cloth, and set the filtrate aside until it cools to about 90° F. Now add the decomposed dough—about 1 oz. (or more) for every gallon—previously diluted with tepid water, mix well, and keep the mixture in a warm place.

Fermentation will soon begin, carbonic acid gas being discharged. When the liquid has become clear, this is drawn off, and the yeast will be found as a layer at the bottom.

This may be used at once, in a semifluid condition, or it may be preserved for use by transferring it to bottles or stone jugs, which must be completely filled, and well stoppered. A layer of olive oil poured on top will keep out the air. The bottles must be kept in a cold and dark place.

No. 2,308.—**Huebl's "Iodine-Number"** (Ga.).

In the course of correspondence with several of our subscribers who are interested in certain fixed oils, it has been ascertained that the knowledge of Huebl's (Hübl's) method of distinguishing oils, by comparing their respective capacity of absorbing and combining with iodine, is comparatively little known or used here. A somewhat detailed description of it will, therefore, be welcome.

Nearly all fats and fixed oils contain members of different groups of fatty acids. One of these groups is that which begins with formic acid (CH_2O_2), and includes, among others, butyric, capric, myristic, palmitic, margaric, stearic, etc., acids. This group represents the so-called saturated fatty acids. Its members have no affinity, under ordinary circumstances, towards halogens, such as iodine.

The fatty acids belonging to the other series, however, that beginning with acrylic ($C_3H_4O_2$)—including hypogæic, oleic, and other acids—and that beginning with tetrolic acid, have a decided affinity for halogens, as they are not saturated. By estimating the amount of iodine which each one can combine with, a clue to the identity of the different fatty acids and fats may be obtained.

Of course, if it is not known beforehand that the fat under examination is derived from a single natural source, the determination of the iodine number is of but little value, since two or more fats, of high and low iodine numbers, may have been mixed together, and the compound may show the iodine number of some simple natural fat of intermediary position. But if the iodine number is either the highest or the lowest that has ever been observed upon pure fats, then the operator has probably samples of pure fats (from either end of the series) under his hands.

Iodine, when brought in contact with fats in the cold, acts upon them very slowly. The application of heat would, in many cases, bring about unreliable results, since even "saturated fatty acids" are apt to form iodine substitution products under these circumstances. Hübl has, however, found that, in presence of mercuric chloride, an alcoholic iodine solution quickly acts upon the fats or oils, there being not only iodine but also chlorine added to the molecule of the fat. It has been shown that for every two atoms of iodine used there must be present one molecule of mercuric chloride. And since most fats or oils are insoluble in alcohol, some chloroform is added as solvent, which does not interfere with the reaction in the least.

The alcoholic, iodized solution of mercuric chloride does not keep long. It must, therefore, be assayed previous to any new series of experiments. The following reagents are required for Hübl's process:

1. Iodized solution of mercuric chloride. Dissolve 25 Gm. of iodine and 30 Gm. of mercuric chloride, each separately, in 500 C.c. of 95% pure alcohol, filter the latter solution, if necessary, and then mix them. Let the mixture stand about twelve hours, during which time it will somewhat change in composition. Then ascertain its strength of iodine by means of the hyposulphite solution.
2. Hyposulphite solution. About 24 Gm. in 1 liter. The strength or titer is determined with pure, sublimed iodine.
3. Pure chloroform. This must be tested by mixing 10 C.c. of it with 10 C.c. of the iodized solution. After standing three hours, it should require exactly the same volume of the hyposulphite solution to discharge the color in the mixture as is required for 10 C.c. of the original iodized solution.
4. Solution of iodide of potassium, 1 in 10.
5. Solution of starch, fresh, 1 per cent.

The sample of fat or oil to be examined is best weighed in a small, light beaker. If solid, it is melted, then poured into a flask of the capacity of 200 C.c., provided with a glass-stopper, and the beaker weighed again. The difference represents the amount put in the flask. The quantity to be taken depends upon the known or expected iodine-figure. Of drying oils, 0.2 to 0.3 Gm. are taken, of non-drying 0.3 to 0.4 Gm., and of solid fats 0.8 to 1.0 Gm. Next, 10 C.c. chloroform are added to the fat in the flask, and when the fat is dissolved, 20 C.c. of the iodine solution are added. If the liquid is not quite clear upon being agitated, a little more chloroform must be added. If the iodine color disappears in a short time, this shows that an insufficient amount of iodine has been added. In this case, 5 or 10 C.c. more are run in. The iodine must be so far in excess that the liquid will possess a deep-brown color even after 2 hours' standing. A decided excess of iodine must always remain over, otherwise the subsequent assay will yield low results.

At the end of two hours, the free iodine is determined by titration. First, about 15 C.c. of the solution of iodide of potassium are added, and then about 150 C.c. of water. A portion of the iodine is contained in the aqueous liquid, and another portion (separated during the dilution) is contained in the chloroform. From a burette divided into $\frac{1}{10}$ C.c. hyposulphite solution is carefully added, the flask being often agitated, until both aqueous and chloroformic layers have lost most of their tint. A little starch is now added, and the titration with hyposulphite cautiously continued—the flask being frequently agitated, while stoppered—until the blue tint of iodide of starch has just disappeared.

Immediately before or after the preceding operation, a measured quantity (say 20 C.c.) of the iodized solution of mercuric chloride is titrated with the same hyposulphite solution, and upon the basis of this assay the strength of the hyposulphite solution is ascertained.

The number of parts of iodine required by 100 parts of any fat or oil is called the "iodine number."

Thus, for instance, the "iodine numbers" of some well-known fats, etc., are as follows:

Oil of Sesame	105 –108	Castor Oil	84– 84.7
" " Cottonseed	105 –108	Butter	26– 32.4
" " Olive	81.6– 84.5	Linseed Oil	170– 181
Lard	57.6– 60		
Oil of Almond	97.5– 99		

Vehicle for Iodide of Potassium.—Dr. Blair some time ago (in the *Boston Med. and Surg. Journ.*) recommended milk as an excellent vehicle for administering iodide of potassium, as it covers the taste of this salt perfectly.